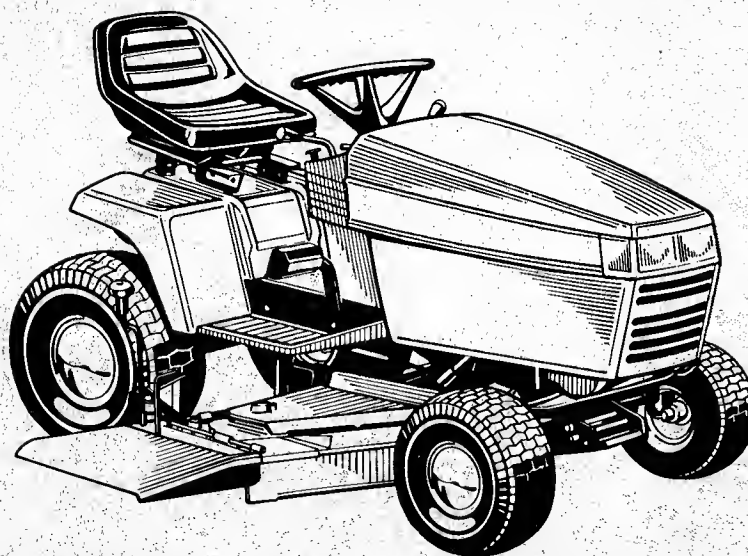


1600 SERIES LAWN TRACTOR

OPERATOR'S MANUAL

**DEUTZ
ALLIS**



Model 1616H

16 HP Hydro: 1691818

1691819

44" Mower: 1691816

Model 1613H

12.5 HP Hydro: 1691817

38" Mower: 1691815

Part No. 71704545

10/89

TO OUR DEALER

DEALER'S PRE-DELIVERY SERVICE GUIDE DETAILS OF ITEMS LISTED BELOW ARE COVERED IN THIS MANUAL	DEALER'S DELIVERY SERVICE GUIDE EXPLAIN TO YOUR CUSTOMER THE CARE, SAFE OPERATION AND ADJUSTMENT OF ITEMS LISTED BELOW:
<div data-bbox="709 868 991 889">CHECK BEFORE OPERATING UNIT</div> <div data-bbox="676 901 966 1055"><ul style="list-style-type: none"><input type="checkbox"/> Shipping Damage Corrected<input type="checkbox"/> Fill Battery with Electrolyte & Fully Charge<input type="checkbox"/> Engine Oil Level Checked (Add When Needed)<input type="checkbox"/> Hydrostatic Oil Level Checked<input type="checkbox"/> Transmission Oil Level Checked<input type="checkbox"/> Check & Tighten Steering Wheel</div> <div data-bbox="709 1068 806 1089">OIL LEAKS</div> <div data-bbox="676 1101 978 1198"><ul style="list-style-type: none"><input type="checkbox"/> Tractor Operated<input type="checkbox"/> Check for Oil Leaks After Engine Warms Up<input type="checkbox"/> Check for Transmission Oil Leaks<input type="checkbox"/> Check for Hydraulic Oil Leaks</div> <div data-bbox="709 1211 785 1232">ENGINE</div> <div data-bbox="676 1243 953 1325"><ul style="list-style-type: none"><input type="checkbox"/> Check Timing<input type="checkbox"/> Check High & Low Idle Speeds<input type="checkbox"/> Check Governor Response<input type="checkbox"/> Air Cleaner Properly Installed</div> <div data-bbox="1058 863 1213 885">COOLING SYSTEM</div> <div data-bbox="1024 896 1264 977"><ul style="list-style-type: none"><input type="checkbox"/> Check Cooling Fins for Damage or Obstruction<input type="checkbox"/> Check Engine Shrouds for Obstruction</div> <div data-bbox="1058 989 1180 1010">POWER TRAIN</div> <div data-bbox="1024 1021 1335 1140"><ul style="list-style-type: none"><input type="checkbox"/> Brake & Clutch Adjusted Properly<input type="checkbox"/> All Belts Adjusted Properly<input type="checkbox"/> Safety Switches Adjusted Properly<input type="checkbox"/> P.T.O. Clutch Adjusted Properly<input type="checkbox"/> Hydrostat Adjusted Properly<input type="checkbox"/> Unit Operated Properly in all Gears</div> <div data-bbox="1058 1151 1146 1172">GENERAL</div> <div data-bbox="1024 1183 1318 1318"><ul style="list-style-type: none"><input type="checkbox"/> All Grease Fittings Lubricated<input type="checkbox"/> Front & Rear Tire Pressure Set<input type="checkbox"/> Traction Operation Checked<input type="checkbox"/> Appearance of Tractor Checked<input type="checkbox"/> All Safety & Operational Decals in Place<input type="checkbox"/> Operator's Manual with Tractors</div>	<div data-bbox="1436 857 1570 878"><input type="checkbox"/> CONTROLS</div> <div data-bbox="1465 893 1575 914">OPERATION</div> <div data-bbox="1436 925 1680 1042"><ul style="list-style-type: none"><input type="checkbox"/> Starting Engine<input type="checkbox"/> Stopping Engine<input type="checkbox"/> Starting Tractor<input type="checkbox"/> Stopping Tractor<input type="checkbox"/> Operating with Mower and Other Implements</div> <div data-bbox="1436 1052 1780 1073"><input type="checkbox"/> OPERATOR'S SAFETY PRECAUTIONS</div> <div data-bbox="1465 1088 1688 1109">LUBRICATION & SERVICE</div> <div data-bbox="1436 1120 1638 1312"><ul style="list-style-type: none"><input type="checkbox"/> Engine Oil<input type="checkbox"/> Engine Fuel<input type="checkbox"/> Transmission<input type="checkbox"/> Grease Fittings<input type="checkbox"/> Air Cleaner<input type="checkbox"/> Engine Cooling Fins<input type="checkbox"/> Battery Care<input type="checkbox"/> Tire Pressure<input type="checkbox"/> Service Parts<input type="checkbox"/> Off-Season Storage</div> <div data-bbox="1465 1325 1608 1346">ADJUSTMENTS</div> <div data-bbox="1436 1357 1621 1474"><ul style="list-style-type: none"><input type="checkbox"/> Seat<input type="checkbox"/> P.T.O. Clutch<input type="checkbox"/> Clutch & Brake<input type="checkbox"/> Belts<input type="checkbox"/> Mower<input type="checkbox"/> Other Implements</div>

TO OUR CUSTOMER

The following pages and illustrations are printed to help supply you with the knowledge to better operate and service your new **DEUTZ-ALLIS** equipment.

We are proud to have you as a customer and feel you will be proud to be a **DEUTZ-ALLIS** owner.

Any piece of equipment needs, and must have a certain amount of service and maintenance to keep it in top running condition. We have attempted to cover all the adjustments required to fit most conditions; however, there may be times when special care must be taken to fit a condition.

Study this operator's manual carefully and become acquainted with all the adjustments and operating procedures before attempting to operate your new equipment. Remember, it is a machine and has been designed and tested to do an efficient job in most operating conditions and will perform in relation to the service it receives.

If special attention is required for some conditions, ask your **DEUTZ-ALLIS** Dealer; his Parts and Service Organization will be glad to help and answer any questions on operation and service of your new machine.



**ATTENTION! BECOME ALERT!
YOUR SAFETY IS INVOLVED!**



This symbol is used to call your attention to safety precautions that should be followed by the operator to avoid accidents. When you see this symbol - Heed Its Warning.

USER'S RESPONSIBILITY

It is the responsibility of the user to read the Operator's Manual and understand the safe and correct operating procedures as pertains to the operation of the product, and to lubricate and maintain the product according to the maintenance schedule in the Operator's Manual.

The user is responsible for inspecting his machine and for having parts repaired or replaced when continued use of the product would cause damage of excessive wear to other parts. It is the user's responsibility to deliver his machine to a Deutz-Allis dealer, for service or replacement of defective parts which are covered by the standard warranty. When requesting warranty service, you must present your copy of delivery record.

If the Dealer is requested by the Customer to travel to another location, or haul the machine to his shop for the purpose of performing a warranty obligation or free inspection, it would be for the Customer's convenience, and the cost for such trips is to be paid for by the Customer. Any arrangement whereby the Dealer agrees to absorb all or a part of the cost of these trips is to be made between the Dealer and the Customer and is to be considered a courtesy to the Customer.

Deutz-Allis does not allow credit for the cost of travel time, mileage, or hauling as a warranty allowance.

WARRANTY. . . . Your Deutz-Allis warranty for any new equipment listed appears on your copy of the Purchase Order and the Warranty Terms and Conditions Statement signed by you and your selling dealer. You will be required to pay any premium for overtime labor requested by you, and charge for making service calls and for transporting the equipment to and from the place where warranty work is performed. Normal maintenance service and repair work not covered by the warranty during the warranty period and all service after the warranty period will be charged at the dealer's regular rates and prices. 3/88

THE DEUTZ-ALLIS NEW EQUIPMENT BATTERY SERVICE ADJUSTMENT POLICY FOR LAWN AND GARDEN EQUIPMENT

LIMITED WARRANTY

1. If within a period of 90 DAYS after day of sale to the original user, a Deutz-Allis new equipment battery becomes unserviceable (not merely discharged) in normal use, due to defective material or workmanship, the Deutz-Allis Corporation will replace it with an equivalent new Deutz-Allis battery, without charge, to the original user.
2. If after the expiration of such 90 DAYS but before the expiration of 24 months from date of sale to the original user (each such month being designated herein as a unit of service) a Deutz-Allis new equipment battery becomes unserviceable (not merely discharged) in normal use, due to defective material or workmanship, it will be replaced for the original user, in exchange for the unserviceable battery, with an equivalent new Deutz-Allis battery at an adjusted price. This adjusted price shall be determined by applying to the then current retail price of the new battery, the percentage of the maximum (24) units of service which was received from the unserviceable battery.

LIMITATIONS

No-charge replacements or adjustments under this policy may be made by any authorized Deutz-Allis Lawn and Garden Equipment dealer.

This policy does not cover the following:

1. Unserviceability due to abuse or neglect, failure to maintain recommended electrolyte level, fire wreckage, explosion; freezing, the addition to the battery of any chemical or solution other than approved water or battery grade sulfuric acid of proper gravity, the use of a group size smaller than the group size of the original equipment battery, or continued operation of the battery in an undercharged condition (below half charge - 1.190 sp. gr.).
2. Breakage of containers, covers or posts.
3. The cost of transportation, service calls, recharges or the use of rental batteries.

PROOF OF DATE OF PURCHASE IS REQUIRED FOR ALL CLAIMS. DEUTZ-ALLIS CORPORATION WILL HAVE NO OBLIGATIONS UNDER THIS POLICY IF THE DATE CODING ON THE BATTERY IS REMOVED OR DESTROYED. IN NO EVENT WILL DEUTZ-ALLIS CORPORATION BE LIABLE FOR CONSEQUENTIAL DAMAGES.

L & G 7/85

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NOTE

In this manual, "left" and "right" are referred to as seen from the operating position.

Safety Rules



Read these safety rules and follow them closely. Failure to obey these rules could result in loss of control of vehicle, severe personal injury to your yourself or bystanders, or damage to property or equipment. The triangle  In text signifies important cautions or warnings which must be followed.

- Know the controls and how to stop quickly. **READ THIS OPERATOR'S MANUAL** and instructions furnished with attachments.
- Do not allow children to operate the machine. Do not allow adults to operate it without proper instruction.
- Do not carry passengers. Do not mow when children and others are around.
- Clear the work area of objects (wire, rocks, etc.) that might be picked up and thrown.
- Operator must be in seat with transmission in neutral and PTO disengaged before attempting to start engine.
- Disengage power to attachments and stop the engine (motor) before leaving the operator's position.
- Disengage power to attachments, stop the engine (motor), and set parking brake before making any repairs or adjustments.
- Disengage power to attachments when transporting or not in use.
- Take all possible precautions when leaving the vehicle unattended, such as disengaging the power-take-off, lowering the attachments, setting the parking brake, stopping the engine, and removing the key.

- Do not stop or start suddenly when going uphill or downhill. Mow up and down the face of steep slopes; never across the face. Read "Operation on Slopes" section, page 13.
- Reduce speed and exercise extreme caution on slopes and in sharp turns to prevent tipping or loss of control. Be especially cautious when changing direction on slopes.
- Stay alert for holes, rocks, and roots in the terrain and other hidden hazards. Keep away from drop-offs.
- Do not use tractor to pull extremely heavy loads, loss of steering could result. Follow operating guidelines in attachment manuals.
- Use caution when carrying loads.
 - a. limit loads to those you can safely control.
 - b. Do not turn sharply. Use care when backing.
 - c. Use counterweights or wheel weights when suggested in this Operator's Manual or Attachment Operator's Manual.
- Watch out for traffic when crossing or near roadways.
- When using any attachments, never direct discharge of material toward bystanders or allow anyone near the vehicle while in operation.

Safety Rules

- Handle gasoline with care — it is highly flammable.
 - a. Use approved gasoline container.
 - b. Never remove the fuel cap of, or add gasoline to, a running or hot engine or an engine that has not been allowed to cool for several minutes after running. Never fill the tank indoors and always clean up spilled gasoline.
 - c. Open doors if the engine is run in the garage — exhaust fumes are dangerous. Do not run the engine indoors.
- Keep the vehicle and attachments in good operating condition, and keep safety devices in place and in working condition.
- Keep all nuts, bolts, and screws tight to be sure the equipment is in safe working condition.
- Never store the equipment with gasoline in the tank inside a building where fumes may reach an open flame or spark. Allow the engine to cool before storing in any enclosure.
- To reduce fire hazard, keep the engine free of grass, leaves, or excessive grease.
- The vehicle and attachments should be stopped and inspected for damage after striking a foreign object, and the damage should be repaired before restarting and operating the equipment.
- Do not change the engine governor settings or overspeed the engine.

- Follow these guidelines for safe operation:
 - a. Mow only in daylight or in good artificial light.
 - b. Shut the engine (motor) off when removing the grass catcher or unclogging chute.
 - c. Check the blade mounting bolts for proper tightness at frequent intervals.
- Under normal usage, the grass catcher bag material is subject to deterioration and wear. Check bag frequently for deterioration and wear and replace worn bags. Check that replacement bags comply with the original manufacturer's recommendations or specifications.
- Disengage electric PTO clutch before backing up. Do not mow in reverse unless absolutely necessary and then only after observation of the entire area behind the mower.



WARNING

Never operate on slopes greater than 30 percent (16.7°) which is a rise of three feet in a travel distance of ten feet. When operating on slopes that are greater than 15 percent (8.5°) but less than 30 percent, use front counterweights and rear wheel weights. In addition to front and rear weights, use extra caution when operating on slopes with rear-mounted grass catcher.

⚠ DANGER

**ROTATING BLADES
CUT OFF ARMS
AND LEGS**

**STOP MOWER WHEN
CHILDREN ARE NEAR
NO RIDERS, THEY FALL OFF**

⚠ DANGER

**OPERATING
ON SLOPES
CAN BE DANGEROUS**

**SEE OPERATOR'S MANUAL
IF YOU CANNOT BACK UP A HILL,
DO NOT DRIVE ON IT**

⚠ CAUTION**TO AVOID POSSIBLE INJURY**

- READ OPERATOR'S MANUAL(S)
- KNOW LOCATION AND FUNCTION OF ALL CONTROLS
- KEEP SAFETY DEVICES (GUARDS, SHIELDS AND SWITCHES) IN PLACE AND WORKING
- REMOVE OBJECTS THAT COULD BE THROWN BY BLADE
- DO NOT MOW WHEN CHILDREN AND OTHERS ARE AROUND
- NEVER CARRY CHILDREN
- ALWAYS LOOK BEHIND MACHINE BEFORE BACKING
- DO NOT MOW WHERE MACHINE COULD TIP OR SLIP
- IF MACHINE STOPS GOING UPHILL, STOP BLADE & BACK SLOWLY DOWN
- BE SURE BLADE AND ENGINE ARE STOPPED BEFORE PLACING HANDS OR FEET NEAR BLADE
- DO NOT MOW IN REVERSE UNLESS ABSOLUTELY NECESSARY
- WHEN LEAVING MACHINE, REMOVE KEY AND SET PARKING BRAKE

⚠ CAUTION DO NOT TOW TRACTOR
DAMAGE WILL RESULT TO HYDROSTATIC TRANSMISSION

OPERATION**TO START ENGINE**

SEAT MUST BE OCCUPIED. GROUND SPEED CONTROL LEVER IN NEUTRAL AND PTO SWITCH OFF

WHEN OPERATOR LEAVES SEAT:

ENGINE WILL SHUT OFF WITH GROUND SPEED CONTROL LEVER IN FORWARD OR REVERSE, OR WITH PTO SWITCH ON.

TO STOP TRACTOR MOTION

FULLY DEPRESS BRAKE PEDAL

TO ENGAGE THE PTO CLUTCH

THE OPERATOR MUST BE IN SEAT

CHOKE



PTO SWITCH



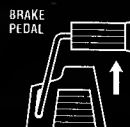
IGNITION SWITCH

**TO SET PARKING BRAKE**

- PULL KNOB OUT WHILE BRAKE PEDAL IS DEPRESSED
- RELEASE BRAKE PEDAL WHILE HOLDING KNOB

**TO RELEASE PARKING BRAKE**

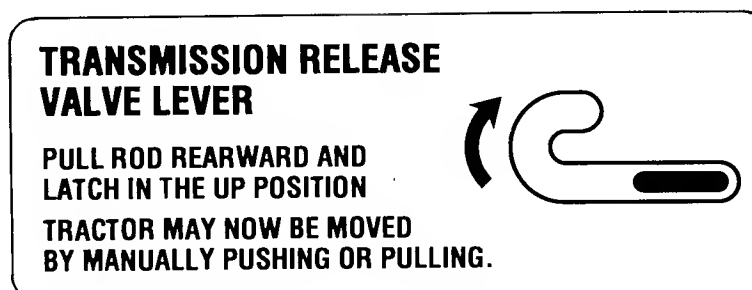
- DEPRESS BRAKE PEDAL
- PUSH KNOB IN WHILE BRAKE PEDAL IS DEPRESSED



MOWER
UP



MOWER
DOWN



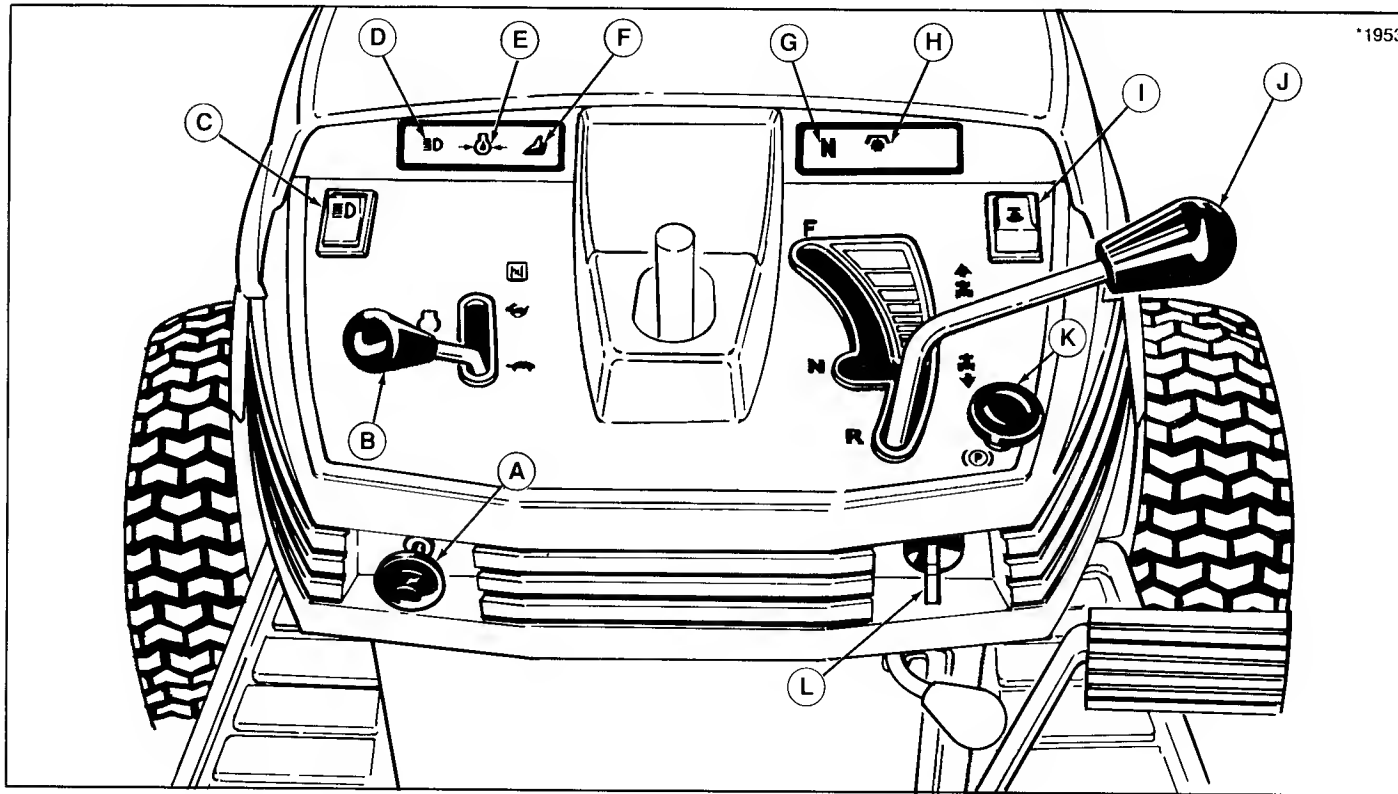


Figure 1. Controls (See page 44 for chart of International Symbols.)

ITEM	NAME	FUNCTION
A	Choke (Twin Cylinder Only)	Pull out to close choke. Aids in starting a cold engine.
B	Engine Speed Control Lever	Controls engine speed. On Single cylinder models, push fully forward to close choke.
C	Headlight Switch	Push front down to turn headlight on, push back to turn headlight off.
D	Headlight Indicator Light (Blue)	Indicates headlights on when lit.
E	Oil Pressure Indicator Light (Red)	Indicates low oil pressure (when engine is running). Lights up with ignition key (L) turned on. Should go out immediately after engine starts.
F	Operator Seated Indicator Light (Green)	Indicates operator present/seat switch engaged. Must be lit for engine to start. For more details, refer to "Safety Interlock System".
G	Neutral Indicator Light (Green)	Indicates transmission lever (J) is in neutral gate. Must be lit for engine to start.
H	PTO Indicator Light (Red)	Indicates electric PTO switch (I) is on. Must be off for engine to start.
I	Electric PTO Switch	Controls PTO clutch for attachments. Slide back and pull up to engage clutch, push down to disengage. Activates PTO light, item H.
J	Transmission Control Lever	Controls ground speed and forward/reverse motion. Push forward to go forward. Pull back to go in reverse. Ground speed is controlled by how far lever is in forward or reverse gate.
K	Parking Brake Control Knob	Engages parking brake. Depress clutch/brake pedal (D, figure 4) fully and pull up knob. To disengage brake, depress pedal and push knob down.
L	Ignition Switch	Starts and stops engine.

Figure 1. Controls (See page 44 for chart of International Symbols.)

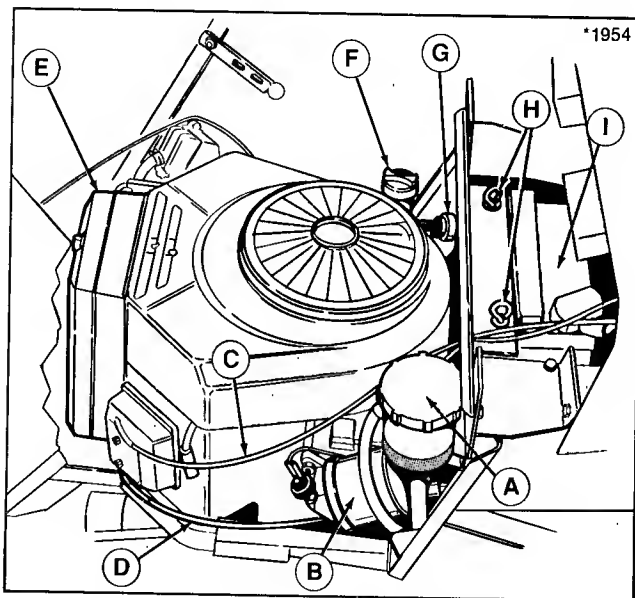


Figure 2. Twin Cylinder Engine Compartment

ITEM	NAME	DESCRIPTION
A	Hydro Reservoir	Fill with 30W nondetergent oil to "FULL COLD" mark.
B	Oil Filter	Spin-on filter for easy maintenance. Refer to Engine Manual for recommended service intervals and procedures.
C	Throttle Cable	Controls engine speed and RPM level. See Engine Manual for adjustment.
D	Choke Cable	Controls choke position. See Engine Manual for adjustment.
E	Air Filter	See Engine Manual for maintenance instruction.
F	Oil Fill/ Dipstick	Turn and remove to check or add oil. See Engine Manual for dipstick instruction.
G	Fuel Filter	In-line filter for straining particles in fuel lines and fuel tank.
H	Battery Holddown Rods	Spin-off rods retain battery clamp and battery.
I	Battery	12 volt, 340 amp battery recharged by engine alternator.

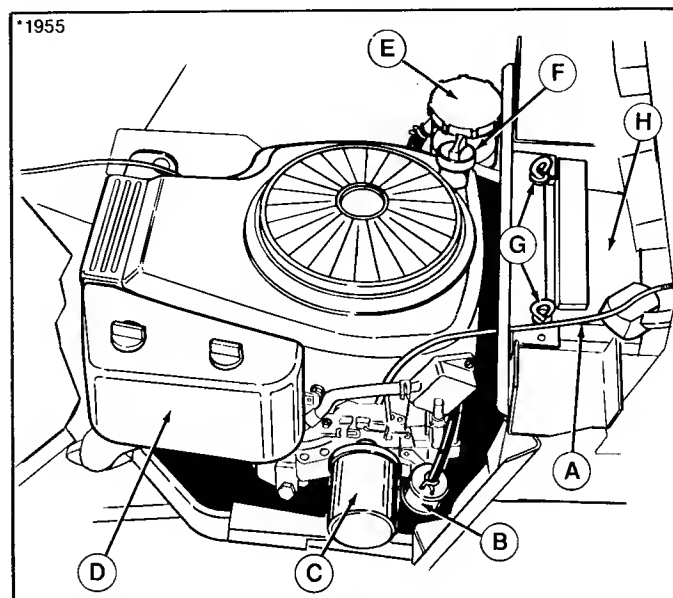


Figure 3. Single Cylinder Engine Compartment

ITEM	NAME	DESCRIPTION
A	Throttle/Choke Cable	Controls engine speed, RPM level and choke position. See Engine Manual for adjustment.
B	Fuel Filter	In-line filter for straining particles in fuel lines and fuel tank.
C	Oil Filter	Spin-on oil filter for easy maintenance. Refer to Engine Manual for recommended service intervals and procedures.
D	Air Filter	See Engine Manual for maintenance instruction.
E	Hydro Reservoir	Fill with 30W nondetergent oil to "FULL COLD" mark.
F	Oil Fill/Dipstick	Turn and remove to check or add oil. See Engine Manual for dipstick instruction.
G	Battery Holddown Rods	Spin-off rods retain battery clamp and battery.
H	Battery	12 volt, 340 amp battery recharged by engine alternator.

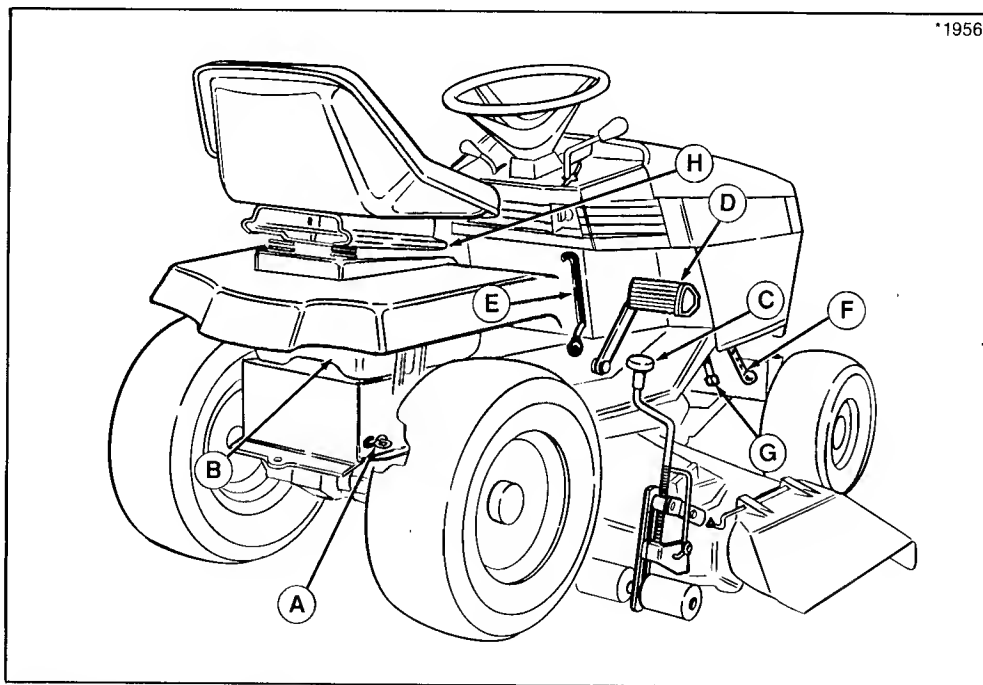


Figure 4. Tractor Controls

ITEM	NAME	FUNCTION
A	Transmission Release Lever	Engages/disengages transaxle to drive or push tractor. Refer to page 16 for more information.
B	Fuel Tank with Gauge	4-gallon (15.1 L) fuel tank with built-in gauge in filler cap.
C	Mower Height Adjuster	Controls height of mower cut. Infinitely adjustable from 1" to 3-5/8" cutting heights.
D	Brake/Clutch/ Parking Brake Pedal	Press down to disengage drive and apply brake. Depressing the brake pedal returns the transmission control lever (J, figure 1) to neutral. For parking brake, depress pedal fully and lift control knob (K, figure 1).
E	Mower Lift Lever	Lifts and locks mower into transport position when lever is raised and moved into top position.
F	Hood Latch	Rubber strap secures hood to frame. Release strap on each side to raise engine hood.
G	Oil Drain	Oil drain extension tube allows for engine oil to be drained from underneath tractor frame.
H	Seat Lever	Releases seat for forward/back seat position.

Operation

SAFETY INTERLOCK SYSTEM

Your tractor is equipped with a seat switch safety system that will automatically shut the engine off when the operator leaves the seat with the transmission lever in gear or PTO engaged. Once the engine has stopped, the electric PTO switch must be turned off after operator returns to seat in order to start the engine.

Check operation of dash safety lights. With operator in seat and ignition switch turned to ON (engine not running):

- Neutral light should go on with transmission lever in neutral gate and should go out when lever is moved to either forward/reverse gate.
- PTO light should go on and off with operation of PTO switch.
- Oil pressure light should be on and should go out immediately after engine starts.
- Operator present light should go on and off as operator lifts off seat.

Seat Switch Tests

Check the seat switch (A, figure 5) every fall and spring with the following four tests.

WARNING

If the tractor does not pass the test, do not operate tractor. See your authorized dealer. Under no circumstance should you attempt to defeat the purpose of the safety system.

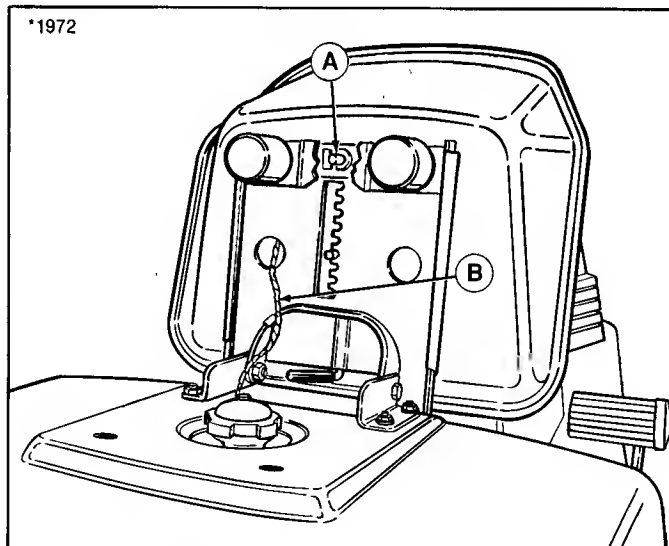


Figure 5. Seat Switch

A. Seat Switch

B. Wiring Harness

Test 1 — Engine should NOT crank if:

- A. Seat not occupied or;
- B. Transmission lever out of neutral, or;
- C. PTO switch engaged.

Test 2 — Engine should crank if:

- A. Seat is occupied, and;
- B. Transmission lever in neutral, and;
- C. PTO switch disengaged.

Test 3 — Engine should shut off if:

- A. Operator rises off seat with transmission lever in gear, or;
- B. Operator rises off seat with PTO engaged.
- C. If operator returns to seat before engine stops, the engine will restart and electric PTO clutch will re-engage.

Test 4 — Electric clutch will disengage if:

- A. Operator rises off seat with engine running.
- B. If operator returns to seat before engine stops, the engine will resume speed and electric PTO clutch will re-engage.

OPERATION ON SLOPES



WARNING

Never operate on slopes greater than 30 percent (16.7°) which is a rise of three feet in a travel distance of ten feet. When operating on slopes that are greater than 15 percent (8.5°) but less than 30 percent, use front counterweights and rear wheel weights. In addition to front and rear weights, use extra caution when operating on slopes with rear-mounted grass catcher.

To safely mow on slopes, perform the following common-sense test to determine if slope is too steep for tractor use:

1. Try to back directly up the slope. If tractor easily climbs slope in reverse, tractor can safely be used to mow slope by going directly up and down the face of the slope. DO NOT MOW ACROSS THE FACE OF SLOPES OVER 15%, ONLY MOW UP AND DOWN.
2. If tractor fails to climb slope in reverse, do not use tractor to mow slope. Use push mower and follow safety guidelines in Operator's Manual for push mower.
3. Do not start or stop on slopes when mowing up and down the face of slopes.

CHECKS BEFORE STARTING



WARNING

Never add gasoline when engine is running.

1. Check that gas tank is at least 3/4 full to avoid refueling.
2. Check engine oil level and add if necessary. Refer to engine Owner's Manual for recommendations.
3. Make sure either mower deflector or grass collection system is in place.
4. Check for loose nuts, screws, bolts, oil leaks, gasoline leaks, etc.
5. Make sure the mower is in desired cutting height.
6. Check the transmission release lever is in the disengaged position. See "Pushing Tractor By Hand."

STARTING AND STOPPING



WARNING

Never allow passengers to ride on the unit.

1. Before using this mower for the first time, the owner should operate in an open area, without mowing, to become accustomed to the unit. The left side of the mower can be used to trim close to objects in the lawn. Read "Operation on Slopes", page 13.
2. Make sure PTO is disengaged and transmission control lever is in neutral.
3. For cold starts, pull choke knob out (twin cylinder models) or push engine speed control into choke position (single cylinder models).
For warm starts, set engine speed control between 1/2 and 3/4 throttle.
4. Turn the key to start and release when engine starts. Release choke or move lever out of choke position as engine warms.
5. Make sure desired direction is clear of objects, people and animals.
6. Release the parking brake.

7. Move the transmission control lever out of Neutral to travel. Push forward to go forward, or pull back to go in reverse.
8. Place engine speed control lever to full throttle, especially if mowing thick grass. Ground speed can be controlled by placement of transmission lever (J, figure 1).
9. Lower mower from transport position. Use the electric PTO switch to engage mower or attachment drive.
10. Select the appropriate ground speed for conditions. If the terrain is rough, hilly or sloping, drive slowly. You should also drive slowly to cut thick grass.
11. Use the transmission control lever to slow down for turns or to trim around objects, then increase speed. To stop, move the control lever into NEUTRAL position. You can also stop by depressing the the clutch/brake pedal. If you stop by depressing the pedal, the transmission control lever will automatically return to the neutral position.
12. **Before leaving operator's position**, set the parking brake and disengage the mower PTO. (The parking brake is shown set in figure 6.) Set the engine speed control to SLOW and allow the engine to idle for 20 seconds. Turn the key to OFF and remove it. Wait for moving parts to stop.
13. Clean all dirt and grass from the mower and tractor. Be sure to clean the engine and transmission compartment. Allow engine to cool before touching engine parts.

CLUTCH/BRAKE PEDAL OPERATION

Refer to figure 6. Depressing pedal from position A to B disengages transmission drive, tractor brake applies and returns the transmission control lever to neutral. Parking brake is applied at position C when parking brake control knob (D, figure 6) is pulled up with pedal fully depressed.

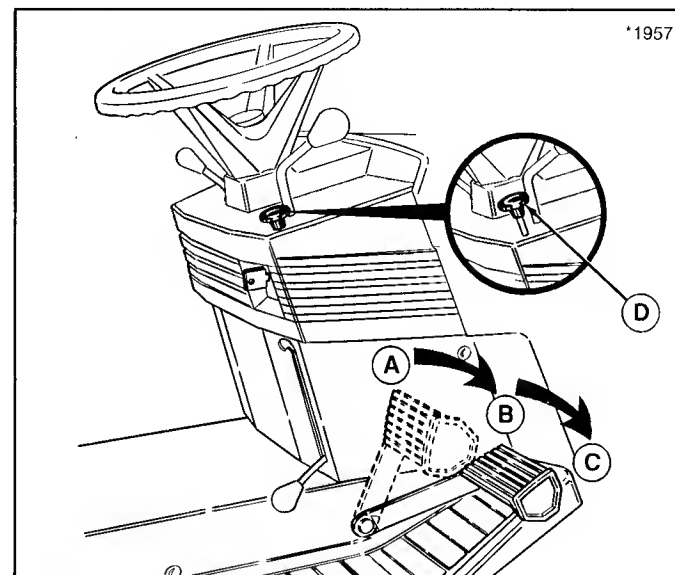


Figure 6. Clutch/Brake/Parking Brake Pedal

MOWING PATTERN & TIPS

For the first use of the mower choose a smooth level area. Cut long straight strips overlapping slightly.

The size and type of area to be mowed determines the best mowing pattern to use. Obstructions such as trees, fences and buildings must also be considered. Where possible, make one or two passes in a clockwise direction around the outside of the area to keep cut grass off fences and walks. The remainder of the mowing should be done in a counterclockwise direction so the clippings are dispersed on the cut area.

Most lawns should be mowed to keep the grass approximately two to three inches (50 to 76 mm) high. Best results are obtained by cutting often and not too short. To help keep a green lawn, never mow more than one third of the height of the grass, or a maximum of one inch (25 mm), in one mowing. For extremely tall grass, set the cutting height at maximum for the first pass, and then reset to the desired height and mow again.

Adjust the cutting height as necessary. For best appearance, grass should be cut in the afternoon or early evening (in daylight) when it is free of external moisture.

Where possible, change patterns occasionally to eliminate matting, graining or a corrugated appearance.

PUSHING TRACTOR BY HAND

To push the tractor by hand, the transmission release lever (A, figure 7) must be engaged (toward the rear of tractor).

To drive tractor, the release lever must be placed back in the "drive" position (towards front of tractor). Refer to figure 7.

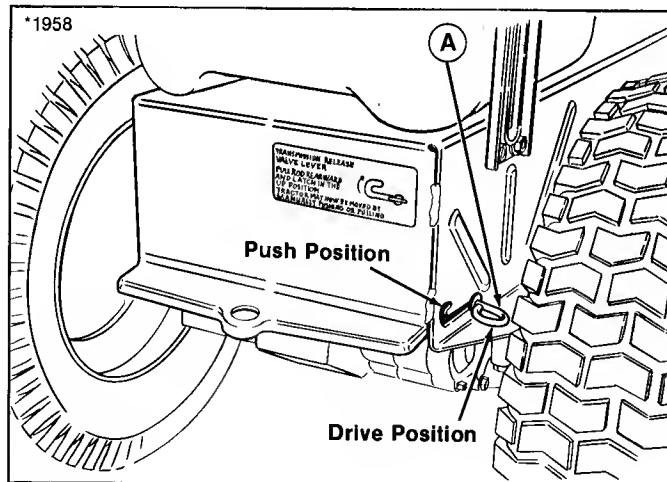


Figure 7.

Normal Care

Safety Items	See	Before First Use	Before Each Use	Every 5 Hours	Every 25 Hours	Every 100 Hours	Spring & Fall
Check safety interlock system.	pg. 12	•					•
Check tractor brakes.	pg. 15	•					•
Check return-to-neutral system.	pg. 42	•	After adjustment or service of transaxle/brake system.				•
Check mower blade stopping time.	pg. 42	•	After adjustment or service of electric PTO clutch.				•
Normal Care Items							
Check tractor & mower for loose nuts, screws, bolts, oil leaks, etc.		•	•	•			
Check engine oil level.	Eng.Mn.	•	•	•			
Check engine & air filter.	" "				**•		
Change engine oil and filter.*	" "				**•		***•
Lubricate tractor & mower.	pg. 18				**•		
Check fluid levels & tire pressure.	pg. 22	•	•		**•		
Check transmission fluid.	pg. 23						
Change transmission fluid.		Every 400 hrs. or for transaxle service only.					
Check fuel filter.	pg. 23					•	
Clean battery & cables.	pg. 22					•	
Clean/sharpen blades.	pg. 27					•	
Inspect spark plug(s).	Eng.Mn.					•	
*Change original engine oil after first 5 hours of operation. **More often in hot (over 85° F: 30° C) weather or dusty operating conditions. ***Only if tractor is used in both summer (over 40° F) and winter (under 40° F: 4.5° C). Use SAE 5W-30 engine oil for cold weather operation (under 30° F).							

Normal Care Schedule

STORAGE (30 Days or More)

1. Run tractor engine until it stops from lack of fuel or, use a gasoline stabilizer. This additive, available from your dealer, prevents formation of gum and varnish for up to one year.



WARNING

Never store tractor where gasoline fumes may reach an open flame or sparks.

2. Change engine oil. Record the type and weight of oil put in crankcase. See the engine Owner's Manual for recommendations.
3. Remove the spark plug(s). Squirt approximately one ounce (30 ml) of engine oil into engine through spark plug hole. Crank engine a few times to distribute oil and then reinstall the spark plug.
4. Lubricate the tractor and mower.
5. Check battery fluid level. Battery life will be extended if it is removed and stored in a cool, dry place, fully charged.
6. Clean tractor thoroughly. Touch up exposed metal parts with a good quality paint (obtainable from your dealer) or a light film of grease or oil.

LUBRICATION

1. With an oil can, apply a few drops of oil to points indicated with oil can in figures 8 through 13.
2. With a grease gun, apply one or two shots of lithium based automotive grease to the grease fittings shown in the following illustrations.

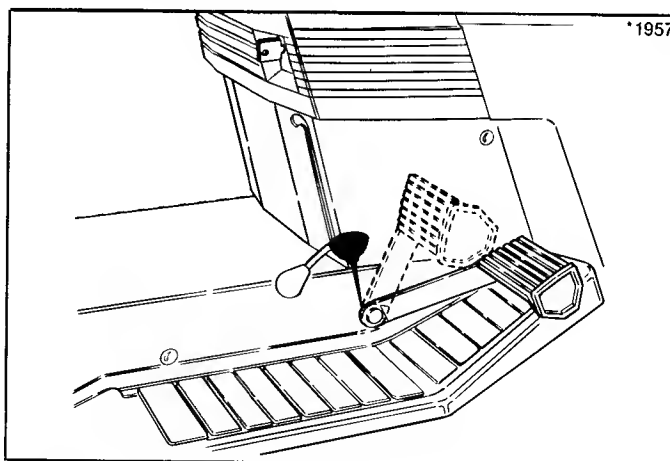


Figure 8. Lubricate Brake Pedal Pivot Point

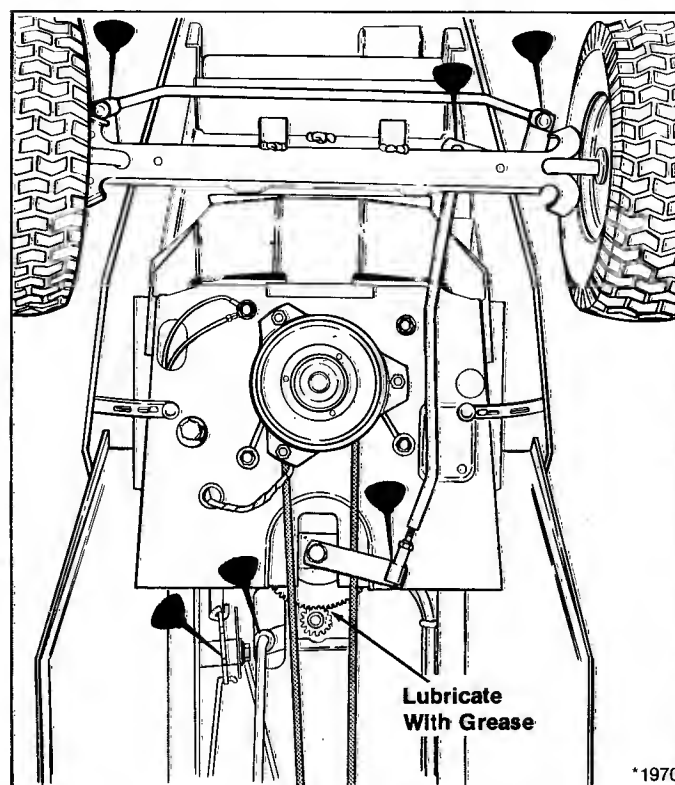


Figure 9. Tractor Lubrication Points - Front Half

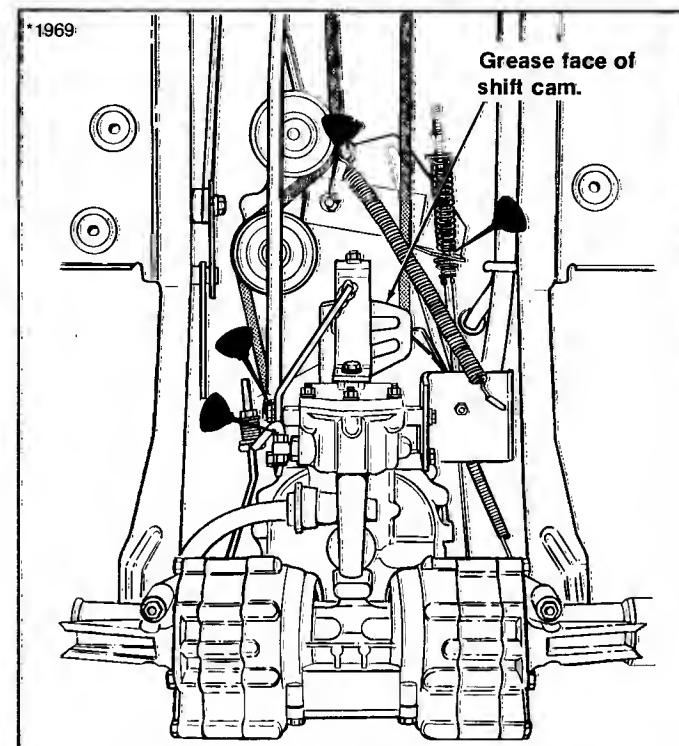


Figure 10. Tractor Lubrication Points - Rear Half

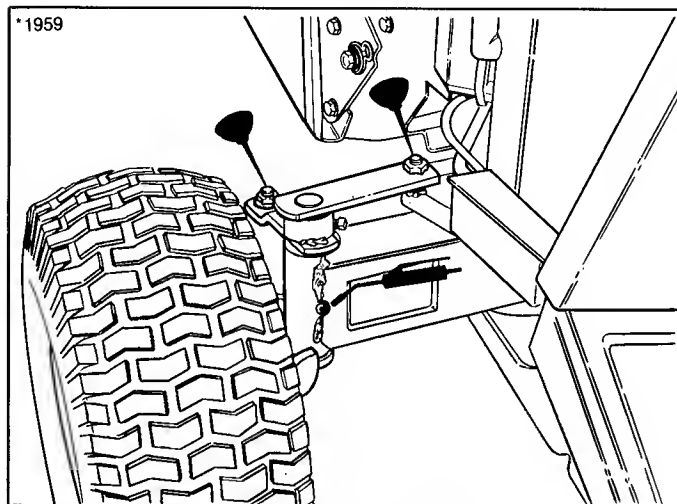


Figure 11. Front Axle Lubrication Points

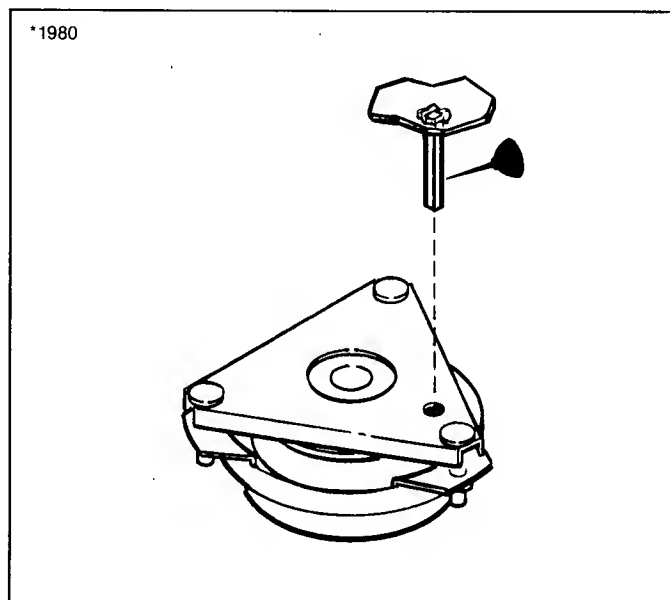


Figure 11A. Electric Clutch
Lubricate tab (welded to underside of frame) whenever electric clutch is removed for service or drive belt replacement.

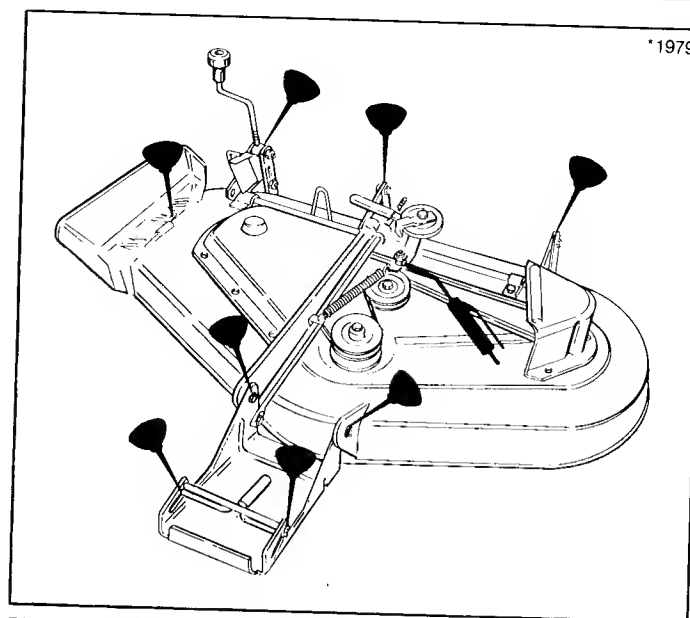


Figure 12. Mower Lubrication Points

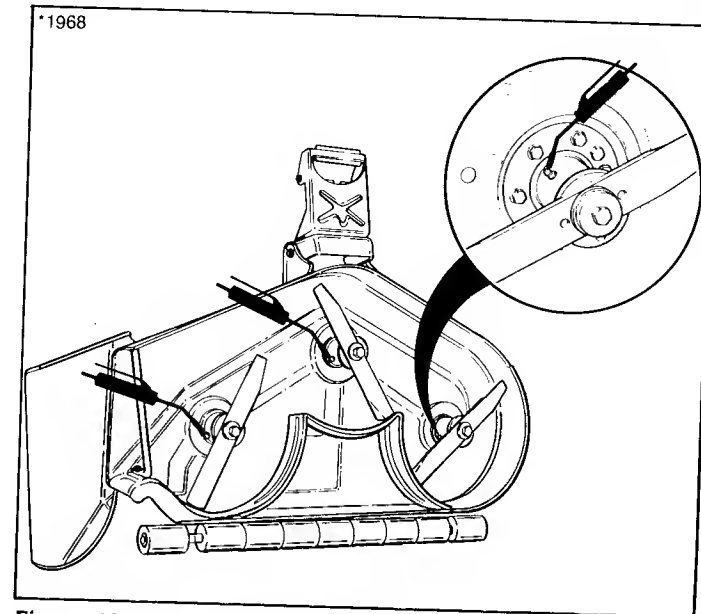


Figure 13. Arbor Lubrication Points

CHECK TIRE PRESSURE

Make sure the air pressure in the front tires is 12 to 15 psi (82 to 100 kPa) and the air pressure in the rear tires is 6 to 8 psi (41 to 55 kPa). Use a gauge with one-pound markings.

BATTERY MAINTENANCE



WARNING

For your personal safety when removing or installing battery cables, always disconnect the negative cable **FIRST** and reconnect it **LAST**. The positive battery terminal can easily be shorted to the tractor frame by a wrench or other tool if this is not done.



WARNING

Be careful when handling the battery. Avoid spilling electrolyte. Keep flames and sparks away from the battery.

Check Fluid Level

Check the battery fluid level. Wipe dirt from around the cap then remove the cap. The fluid must be even with the bottom of the split ring. If not, add distilled water. Reinstall the cap. Be sure the cover is in place over positive terminal. Make sure vent tube from battery cap extends beyond battery platform.

Cleaning Battery and Cables.

1. Open engine compartment to locate battery (figure 14). Disconnect the cables from the battery, negative cable first. A positive "+" sign is stamped on the battery next to the positive terminal.
2. Remove the battery holddown rods and battery clamp. Separate the battery cap from the vent tube (the vent tube should remain routed through the frame). Remove the battery.

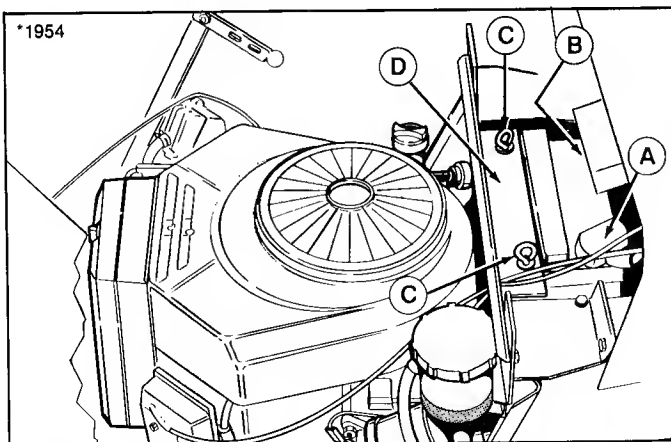


Figure 14. Battery

A. Positive Terminal
B. Negative Terminal

C. Holddown Rod
D. Battery Clamp

3. Clean the battery terminals and cable clamps with a wire brush.
4. Scrub the battery, cable and battery compartment with baking soda and water.
5. Reinstall battery and clamps. Reinstall vent tube to battery cap. Secure the clamps with holddown rods.
6. Connect cables, positive cable first.
7. Coat cable clamps and terminals with petroleum jelly or approved terminal spray coating. Be sure to slide cover over positive terminal.

CHECK FUEL FILTER



WARNING

Do not remove fuel filter when engine is hot, as spilled gasoline may ignite. Do not spread hose clamps further than necessary. Make sure that clamps grip hose firmly over filter after installation.

The fuel filter is located in fuel line in engine compartment. Refer to item G, figure 2 or item B, figure 3. A dirty or clogged fuel filter will cause erratic engine operation or prevent engine from running. Replace as follows:

1. Place a container below fuel filter to catch gasoline.
2. Using a pliers, open and slide hose clamps from fuel filter.

3. Remove hoses from filter.
4. Install new filter in proper flow direction in hoses. Secure by reclamping with hose clamps.
5. If new filter is not available, remove old filter, drain gasoline, and allow to dry. Inspect screen for particles. Tap filter or blow air through filter to remove particles. Replace filter and check if engine operation improves.

CHECK TRANSMISSION FLUID LEVEL

Allow tractor to cool after operation. Fluid must be cool for an accurate check.

1. Release hood straps and raise hood.
2. The fluid level is visible in the reservoir (figure 15) without removing cap. The level should be at FULL COLD mark. If not, go to step 3.
3. Clean the area around the reservoir (A, figure 15) and remove the reservoir cap. Add 30W premium grade nondetergent oil.
4. Fill reservoir to "Full Cold" mark. If the oil is black or milky, see your dealer to determine cause.
5. It will take a while for the oil to seep thru a filter screen into the reservoir. Check the level again after operating the tractor a few times. If level is consistently low, see your dealer to check for leaks.
6. Keep cooling fins on transaxle free of grass and dirt accumulation.

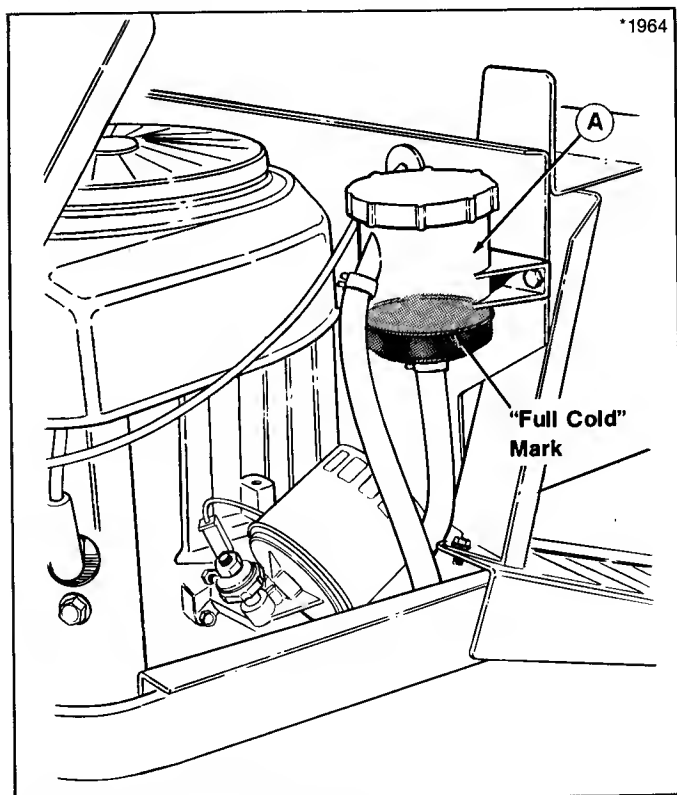


Figure 15. Hydrostatic Reservoir

A. Reservoir

MOWER REMOVAL & INSTALLATION

1. Park tractor on a level surface. Turn off PTO switch and engine and remove key. Apply parking brake and lower mower lift lever from transport position. Turn wheels fully left.
2. On left hand side of tractor, push or pull idler pulley arm (A, figure 16) to relieve belt tension. On 44" mowers, pull lever toward you (outside of tractor); on 38" mowers, push lever away from you (towards inside of tractor).

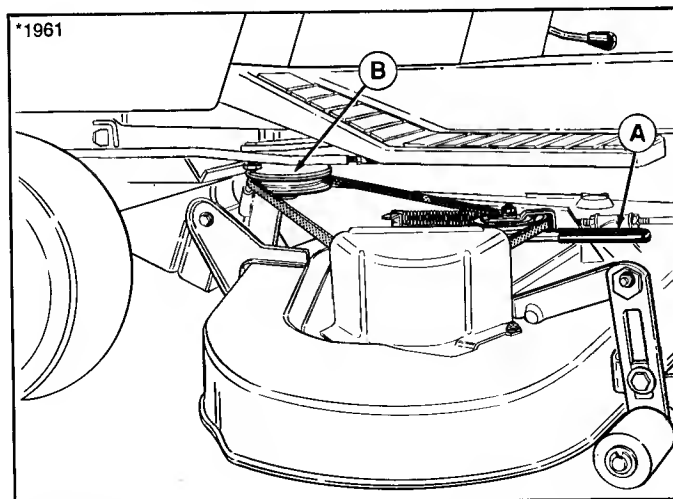


Figure 16.

A. Idler Pulley Arm

B. Electric Clutch Pulley

Normal Care

3. With belt tension relieved, remove belt from electric clutch pulley (B, figure 16). Removing belt relieves the tension on the front hitch assembly.
4. Remove mower from tractor hitch brackets (A, figure 17) by pulling spring-loaded lever (B) forward and lifting up on hitch. Place mower hitch on ground.

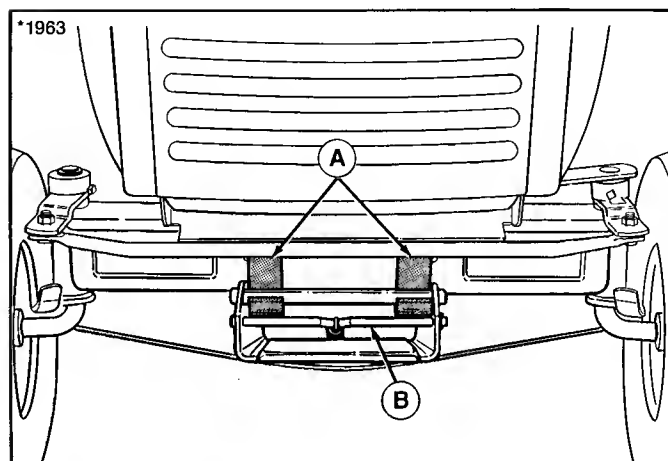


Figure 17.
A. Tractor Hitch Brackets
B. Lever

5. Disconnect mower lift arm (A, figure 18) from tractor lift arm (B) by removing safety clip (C) and flat washer from weld stud. Reinstall washer and clip on mower lift arm for storage.
6. Remove mower from underneath right hand side of tractor.
7. To install mower, reverse above steps. Check mower belt pattern as shown in figure 19.

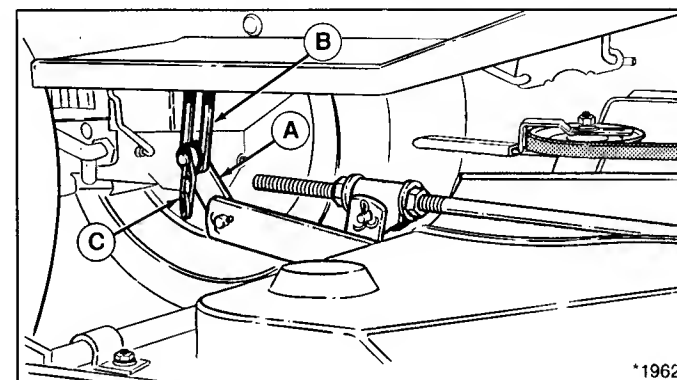


Figure 18.
A. Mower Lift Arm
B. Tractor Lift Arm
C. Safety Clip

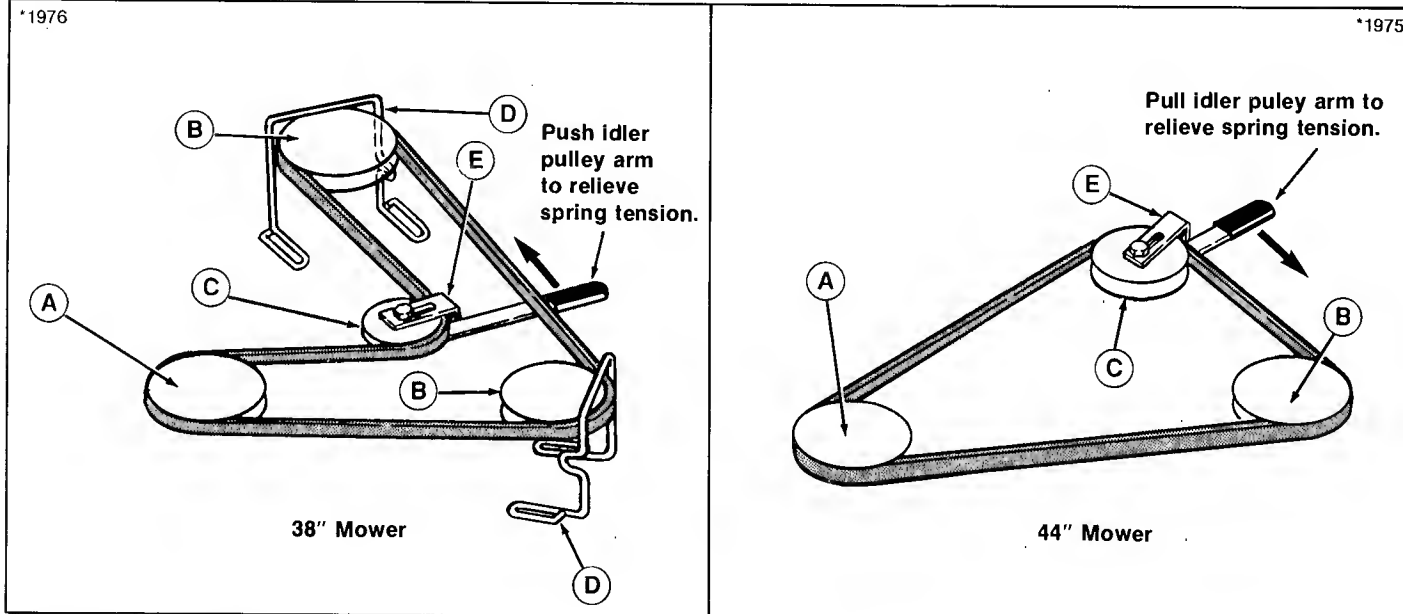


Figure 19. Mower Drive Belt Pattern

A. Electric Clutch Pulley

B. Arbor Pulley(s)

C. Idler Pulley

D. Belt Stop (38" Deck Only)

E. Bracket Belt Stop

SERVICING THE MOWER BLADES



WARNING

Do not handle the blade with bare hands. Do not touch the cutting edge.

Sharpening & Balancing

1. To remove a blade, wedge a wood block between blade and housing to prevent rotation. Then, turn capscrew counterclockwise to remove.
2. Use a file to sharpen blade to a fine edge. Remove all nicks and dents in blade edge. If blade is severely damaged it should be replaced.
3. To balance the blade, use a balancing machine or the following procedure. Drive a small nail into the side of a workbench or other vertical surface. Lubricate the nail with a drop of oil. Center the blade center hole on the nail. A balanced blade will remain level. File material off heavier end of blade until it is balanced.

Blade Installation

1. Reinstall the blade(s) with the tabs pointing upward. Install the spline washer, cup washer, and capscrew (see figure 20). Be sure the splines on the spline washer are engaged with the shaft splines. Be sure cup washer is installed with the concave side up.

2. To tighten the capscrew, wedge a wood block between blade and housing to prevent blade from turning. Torque the capscrew to 50 to 70 ft. lbs. (68-76 Nm).

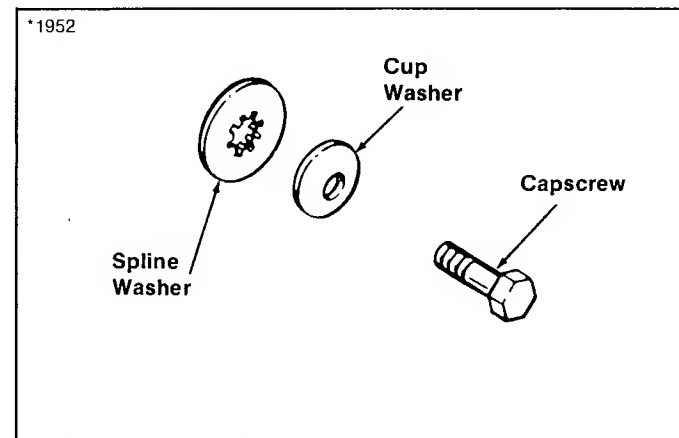


Figure 20. Blade Hardware

Troubleshooting

CONTENT OF SECTION

This section of the manual provides troubleshooting and repair instructions for the more common and easily corrected problems. For other problems, it is recommended that you contact your dealer.



WARNING

Perform maintenance on the tractor or mower only when the engine is stopped and the parking brake engaged. Always remove the ignition key before beginning the maintenance to prevent accidental starting.

Problem	Cause/Remedy
1. Engine will not turnover or start.	<p>A. Transmission lever not in neutral-start position. Shift into neutral.</p> <p>B. Electric PTO switch in ON position. Place in OFF position.</p> <p>C. Out of fuel. Allow engine to cool then refill the fuel tank.</p> <p>D. Engine flooded. Push choke knob in (twin cylinder models) or move Throttle control out of CHOKE position (single cylinder models).</p> <p>E. Circuit breaker tripped. Wait one minute for automatic reset. Replace if defective (see your dealer).</p> <p>F. Battery terminals require cleaning. See Normal Care section.</p> <p>G. Battery discharged or dead. Recharge or replace.</p> <p>H. Wiring loose or broken. Visually check wiring & replace broken or frayed wires. Tighten loose connections.</p> <p>I. Solenoid or starter motor faulty. Repair or replace.</p> <p>J. Safety interlock switch or module faulty. Replace if needed (see your dealer.)</p> <p>K. Spark plug(s) faulty, fouled or incorrectly gapped. Clean and gap or replace. See engine manual.</p> <p>L. Water in fuel. Drain fuel & refill with fresh fuel.</p> <p>M. Old stale gas. Drain fuel & replace with fresh fuel.</p>

Troubleshooting

Problem	Cause/Remedy
2. Engine starts hard or runs poorly.	<p>A. Fuel mixture too rich. Clean air filter. Check choke adjustment (engine speed control). See engine manual.</p> <p>B. Carburetor adjusted incorrectly. See engine manual.</p> <p>C. Spark plug(s) faulty, fouled, or incorrectly gapped. Clean and gap or replace. See engine manual.</p>
3. Engine knocks.	<p>A. Low oil level. Check/add oil as required.</p> <p>B. Using wrong grade oil. See engine manual.</p>
4. Excessive oil consumption.	<p>A. Engine running too hot. Clean engine fins, blower screen and air cleaner.</p> <p>B. Using wrong weight oil. See engine manual.</p> <p>C. Too much oil in crankcase. Drain excessive oil.</p>
5. Engine exhaust is black.	<p>A. Dirty air filter. Clean air filter. See engine manual.</p> <p>B. Check engine speed control adjustment (choke). See engine manual.</p>
6. Engine runs, but tractor will not drive.	<p>A. Transmission control lever in neutral. Shift in forward or reverse.</p> <p>B. Transmission release lever in "push" position. Move into drive position.</p> <p>C. Belt is broken. See "Drive Belt Replacement". (See Adjustments section.)</p> <p>D. Drive belt slips. (See problem and cause below.)</p>
7. Tractor drive belt slips.	<p>A. Clutch is out of adjustment. See your dealer.</p> <p>B. Pulleys or belt greasy or oily. Clean as required.</p> <p>C. Belt stretched or worn. Replace with correct belt.</p> <p>D. Idler pulley pivot bracket "froze" in declutched position. Remove idler pulley, clean and lubricate.</p>

Troubleshooting

Problem	Cause/Remedy
8. Brake will not hold.	A. Brake is incorrectly adjusted. See your dealer. B. Internal brake disc on transaxle worn. See your dealer.
9. Tractor steers hard.	A. Steering linkage is loose. Check and tighten any loose connections. See "Steering Gear Adjustment". B. Improper tire inflation. Check and correct. C. Spindle bearings dry. Grease spindles. See Normal Care - Lubrication section.
10. Drive belt does not stop when clutch-brake depressed.	A. Belt stops out of adjustment. See "Drive Belt Replacement" section.

TROUBLESHOOTING (MOWER)

1. Mower will not raise.	A. Lift arms or lift link not properly attached or damaged. Attach or repair.
2. Mower cut is uneven.	A. Mower not leveled properly. See Mower Leveling. B. Tractor tires not inflated equally or properly. See Normal Care section.
3. Mower cut is rough looking.	A. Engine speed too slow. Set for three-fourths to full speed. B. Ground speed too fast. Use transmission lever to control ground speed. C. Blades dull and require sharpening. See Normal Care section. D. Mower drive belt slipping. Belt oily or worn. Clean or replace belt as necessary. E. Check PTO Clutch Adjustment. Clutch may need to be adjusted. F. Blades not properly fastened to arbors. See Normal Care section.

Troubleshooting

Problem	Cause/Remedy
4. Engine stalls easily with mower engaged.	<p>A. Engine speed too slow. Set for 3/4 to full throttle.</p> <p>B. Ground speed too fast. Use lower gear.</p> <p>C. Carburetor not adjusted properly.</p> <p>D. Cutting height set too low when mowing tall grass. Cut tall grass at maximum cutting height during first pass.</p> <p>E. Discharge chute jamming with cut grass. Cut grass with discharge pointing toward previously cut area.</p>
5. Excessive mower vibration.	<p>A. Mower blades, arbors, or pulleys are bent. Check and replace as necessary.</p> <p>B. Mower blades are out of balance. Remove, sharpen and balance blades (see Normal Care section).</p> <p>C. Belt installed incorrectly. See "Mower Belt Replacement".</p>
6. Excessive belt breakage.	<p>A. Bent or rough pulleys. Repair or replace.</p> <p>B. Using incorrect belt. See your dealer.</p>
7. Mower drive belt slips or fails to drive.	<p>A. Idler pulley spring broken or not properly attached. See your dealer.</p> <p>B. Belt stops out of adjustment. Check.</p> <p>C. Mower drive belt broken. Replace.</p>

BATTERY REPLACEMENT

A battery too weak to start the engine may not need to be replaced. It may, as an example, mean that the charging system is not working properly or that the battery has lost its charge during storage. First check the fluid level and clean the battery. Have the battery recharged if necessary. If there is any doubt about the cause of the problem, see your dealer. If you must replace the battery, remove and install the battery as described in "Clean Battery and Cables."

JUMP STARTING WITH AUXILIARY (BOOSTER) BATTERY

Jump starting is not recommended. First check the battery in "Battery Replacement" above. If jump starting must be done, follow these directions. Both booster and discharged batteries should be treated carefully when using jumper cable. Follow exactly the procedure outlined below, being careful not to cause sparks. Refer to figure 21.



WARNING

Never expose battery to open flame or electric spark — battery action generates hydrogen gas which is flammable and explosive. Do not allow battery acid to contact skin, eyes, fabrics, or painted surfaces. Batteries contain a sulfuric acid solution which can cause serious personal injury or property damage.



WARNING

Any procedure other than the above could result in: (1) personal injury caused by electrolyte squirting out of the battery vents, (2) personal injury or property damage due to the battery explosion, (3) damage to the charging system of the booster vehicle or the other immobilized vehicle.

Do not attempt to jump start a vehicle having a frozen battery because the battery may rupture or explode. If a frozen battery is suspected, examine all fill vents of the battery. If ice can be seen, do not attempt to start with jumper cables.

NOTE

The positive terminal has a cover. Slide cover away to perform this procedure. Slide cover back over positive terminal for normal operation.

1. Set parking brake.
2. Remove vent cap from both the booster and the discharged batteries. Lay a cloth over the open vent wells on each battery. These two actions help reduce the explosion hazard always present in either battery when connecting a "live" battery to a "dead" battery.

Troubleshooting

3. Attach one end on one jumper cable to the positive terminal of the booster battery (identified by a red color, "+" or "P" on the battery case, post or clamp) and the other end of same cable to positive terminal of discharged battery.
4. Attach one end of the remaining cable to the negative terminal (black color, "-" or "N") of the discharged battery, and the other end to a bare metal surface on the frame of your tractor AWAY FROM the battery

compartment (do not connect directly to negative post of booster battery). Take care that clamps from one cable do not inadvertently touch the clamps on the other cable. Do not lean over the battery when making the connection.

5. The tractor with discharged battery should now start.
- Reverse the jump starting procedure exactly to remove the jumper cables. Then reinstall the vent caps and throw the cloths away as they may have corrosive acid on them.

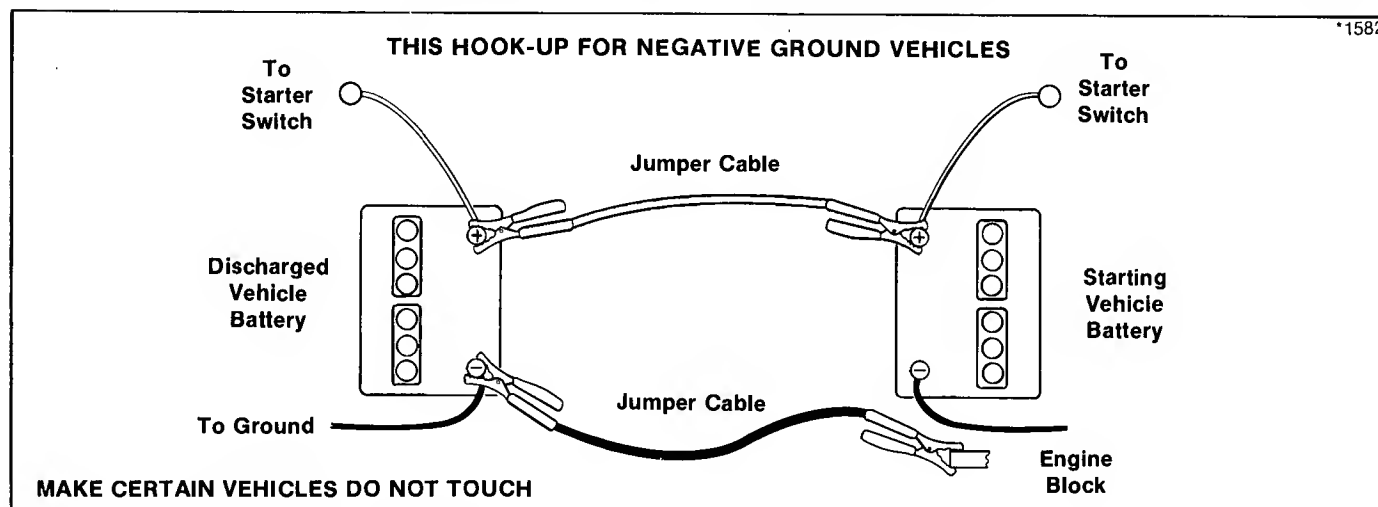


Figure 21. Jump Starting

DRIVE BELT REPLACEMENT

1. Park the tractor on a level surface. Turn off PTO and engine and remove key. Remove mower as described under "Mower Removal".
2. Lock parking brake to relieve belt tension at idler pulley.
3. To remove belt from idler pulley (A, figure 22), loosen flange whiz nuts (B) and washers retaining idler pulleys to bracket. Belt will slip from between belt stops (C) and idler bracket.
4. Release parking brake. Rotate idler pulley to relieve spring tension and remove spring (D).

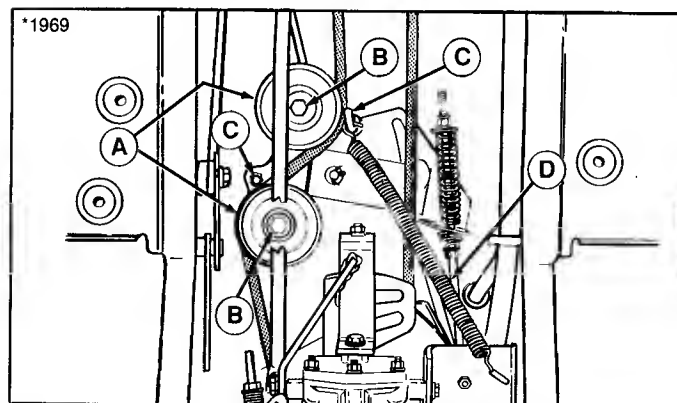


Figure 22.
A. Idler Pulley
B. Flange Whiz Nuts
C. Belt Stops
D. Spring

5. To remove belt from engine pulley, the electric clutch must be removed and the belt slid over the top of the pulley. Remove the capscrow (A, figure 23), washer and lockwasher securing the electric clutch to the engine crankshaft. Slide belt over the top of the engine pulley.
6. Install new belt over engine pulley before reinstalling electric clutch. Reinstall washer, lockwasher, and capscrow. Lubricate weld tab on underside of tractor (refer to figure 11A). Make sure weld tab is aligned with hole in top of electric clutch. Tighten capscrow snug.

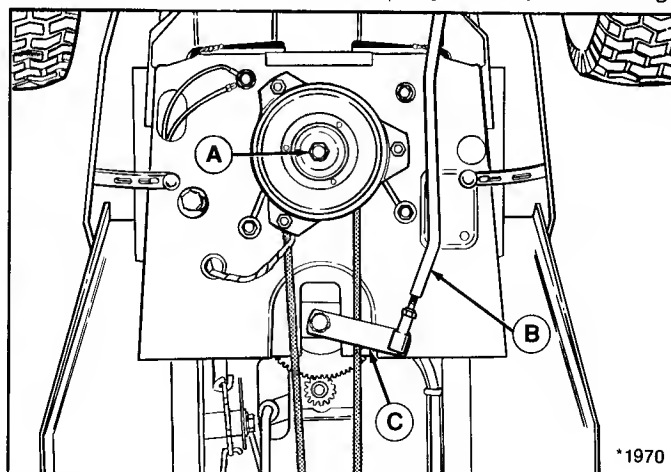


Figure 23.
A. Capscrow
B. Drag Link
C. Steering Arm

7. On left hand side of tractor, remove nut securing drag link (B) to steering arm (C). Drop old belt below drag link. Route new belt above drag link before reinstalling nut on drag link. Tighten nut.
8. Spin transaxle cooling fan counterclockwise to slip belt through fan blade. Remove belt from transaxle pulley and remove from underneath tractor.
9. Install new belt to transaxle pulley by rotating fan clockwise.
10. Reinstall idler pulley spring (D, figure 22) to frame with new belt routed between spring and bottom of frame.
11. Lock parking brake to position idler pulley bracket. Install new belt to idler pulleys. Make sure belt is properly routed on flat and V-sided pulleys. Refer to figure 24. Install washers and flange whiz nuts securing pulleys.
12. Check belt routing around engine pulley, idler pulleys, and transaxle pulley. Check that the electric clutch, drag link, and idler pulley spring are all correctly reinstalled.
13. Start tractor engine and check operation of belt by placing transmission lever in gear and engaging/disengaging clutch pedal.

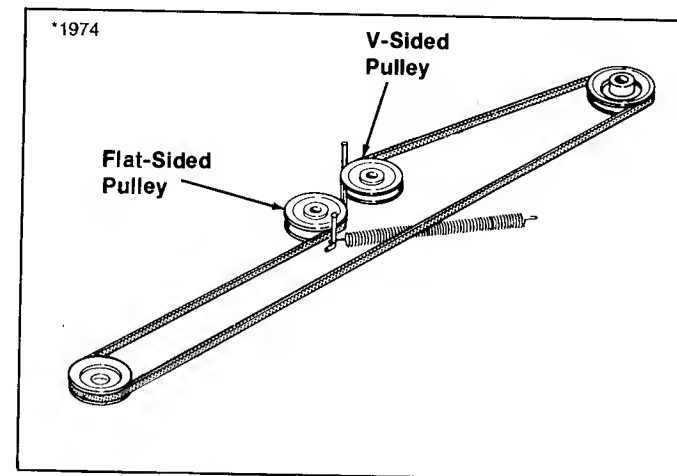


Figure 24. Drive Belt

MOWER BELT REPLACEMENT

38" Mower Drive Belt

1. Mower does not need to be removed to install a new belt. However, for easier access, mower can be removed following steps in "Mower Removal and Installation".
2. If mower is not removed, place mower in low cut position. Push idler pulley arm (A, figure 25) away from you to relieve belt tension. Drop belt from electric clutch pulley (B).
3. Loosen belt stops (C) on arbor drive pulleys.
4. Loosen bracket belt stop (D) on idler pulley.
5. Remove old belt and replace with new belt. Make sure V-side of belt runs in arbor pulley grooves and flat side of belt runs against idler pulley.
6. Position the bracket belt stop (D) up against arm (A) so that there is a 1/8" gap between pulley and belt stop.
7. Retighten the belt stops (C) on arbor drive pulleys with 1/8" gap between stops and pulleys.
8. Reinstall mower if removed, or reinstall belt to electric clutch pulley (B).

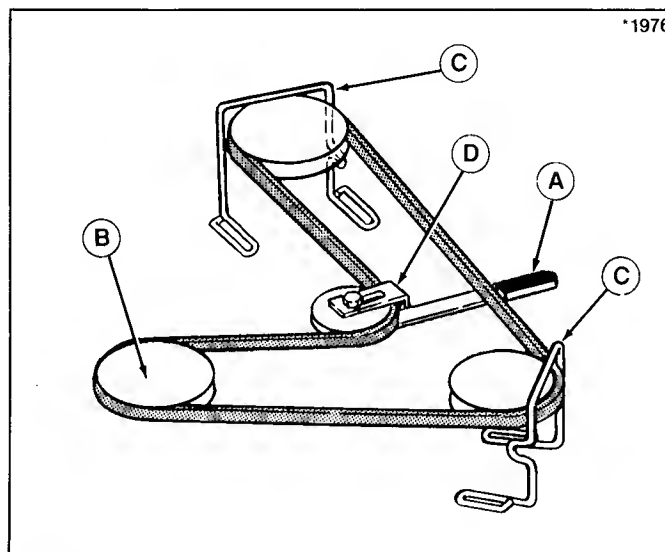


Figure 25.
A. Idler Pulley Arm
B. Electric Clutch Pulley
C. Belt Stops
D. Bracket Belt Stop

44" Mower Drive Belt

1. Mower does not need to be removed to install a new belt. However, for easier access, mower can be removed following steps in "Mower Removal and Installation".
2. If mower is not removed, pull idler pulley arm (A, figure 26) towards you to relieve belt tension. Drop belt from electric clutch pulley (B).
3. Loosen nut and lockwasher securing bracket belt stop (C).

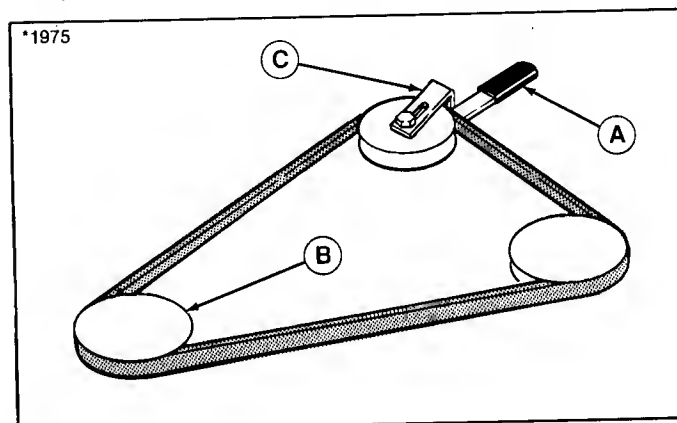


Figure 26.

- A. Idler Pulley Arm
B. Electric Clutch Pulley
C. Bracket Belt Stop

4. Remove three capscrews securing left hand arbor cover (D, figure 27).
5. Remove old belt and replace with new belt. Make sure V-side of belt runs in all arbor pulley grooves.
6. Reinstall arbor cover.
7. Index the bracket belt stop (C, figure 26) up against idler pulley arm (A) as shown in figure 26. Make sure there is a 1/8" gap between belt stop and pulley.
8. Reinstall mower if removed, or reinstall belt to electric clutch pulley.

44" Deck Drive Belt

1. Remove mower from tractor following steps in "Mower Removal and Installation".
2. Remove two capscrews securing upstop (A, figure 27) and remove upstop.
3. Remove four additional capscrews securing right hand arbor cover (B).
4. Remove three capscrews securing left hand arbor cover (D).
5. Using a vise-grip or pliers, remove idler pulley spring (C) from slot in deck.
6. Loosen capscrew (E) securing idler pulley to bracket. Belt can be slipped between pulley and idler bracket hub.

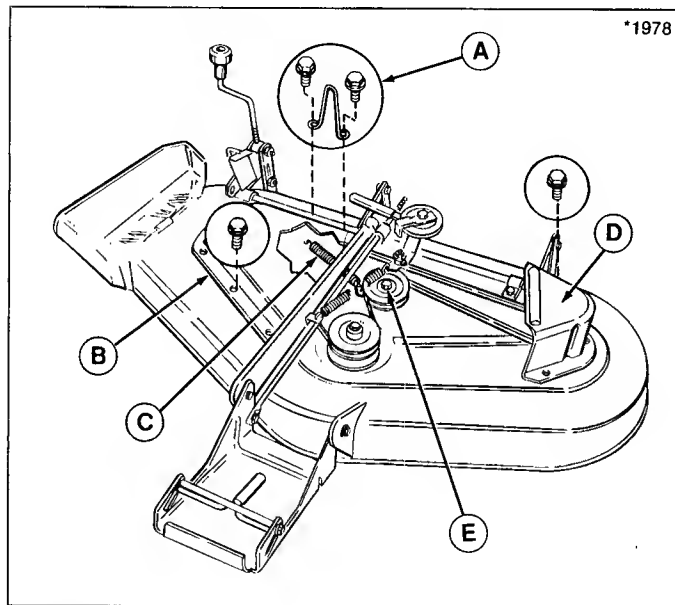


Figure 27.
A. Upstop
B. Right Hand Arbor Cover
C. Spring
D. Left Hand Arbor
E. Capscrew

7. Replace old belt with new belt as shown in figure 28. Make sure that V-side of belt runs in arbor pulley grooves and flat side of belt runs against idler pulley.
8. Reinstall spring to slot in mower deck. Retighten capscrew securing idler pulley.
9. Reinstall left and right arbor cover, and upstop using hardware removed.
10. Reinstall mower to tractor.

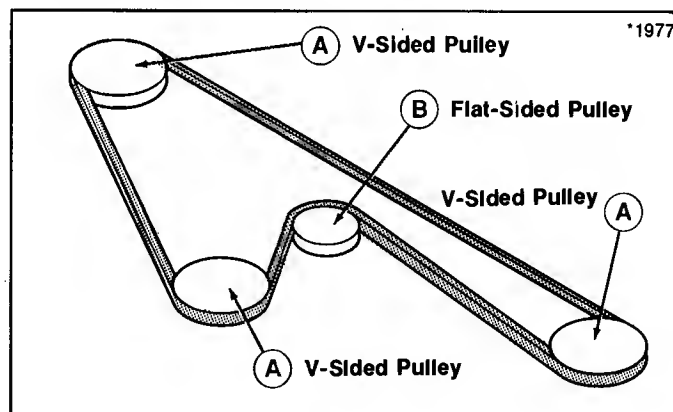


Figure 28.
A. Arbor Drive Pulley (V-Sided)
B. Idler Pulley (Flat Sided)

Adjustments

MOWER LEVELING



WARNING

Before checking mower, shut off PTO and engine.
Allow all moving parts to stop. Remove ignition key.

Side-To-Side

1. Park the tractor on a level surface. Make sure mower lift lever is in the "down" position. Point tires straight ahead.
2. Place mower in mid cut position.
3. Turn the blades side-to-side and measure distance from outside tips of blades to ground. Measurement should be equal (within 1/8"). For adjustment, refer to figure 29.
 - a. Loosen outside nut (A, figure 29).
 - b. Turn eccentric hex nut (B) to raise or lower left-hand side of mower.
 - c. Hold eccentric nut (B) and tighten nut (A). Recheck measurement.

(Continued)

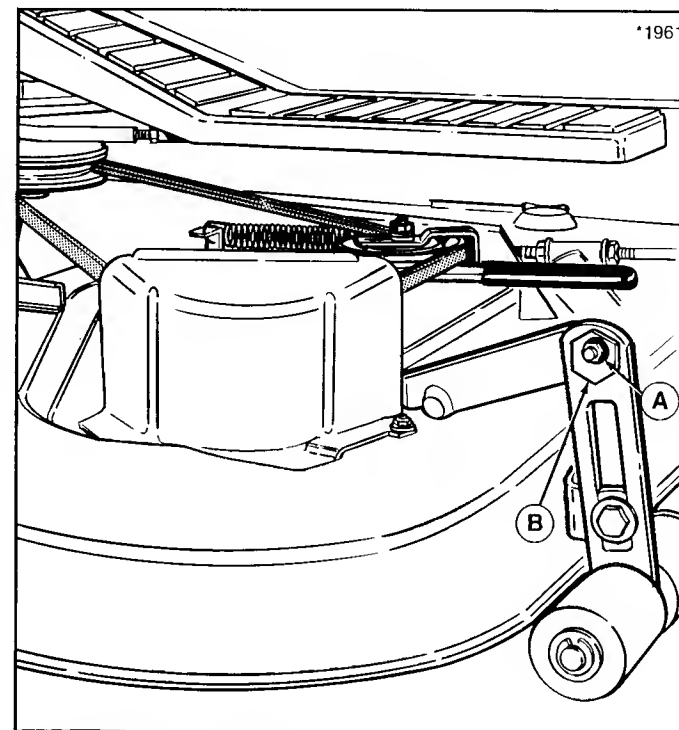


Figure 29. Side-To-Side Leveling

A. Outside Nut
B. Eccentric Nut

Front-To-Back Leveling

4. Turn the blades front-to-back. On 44" deck, measure the distance from the ground to the front tip of the center blade, and from the ground to rear tips of left-hand and right hand blades. On 38" deck, measure the distance from the ground to front tip of the right blade, and from the ground to the rear tips of the left and right hand blades. Front tips should be 1/4" higher in front. For adjustment, refer to figure 30.
 - a. To raise front of mower deck, loosen front nut (A) and turn rear nut (B) against bracket (C) to shorten rod (D).
 - b. To lower front of mower deck, loosen rear nut (B) and bracket (C) will move backwards to lengthen rod (D).
 - c. Recheck measurement before tightening front nut (A) against bracket.

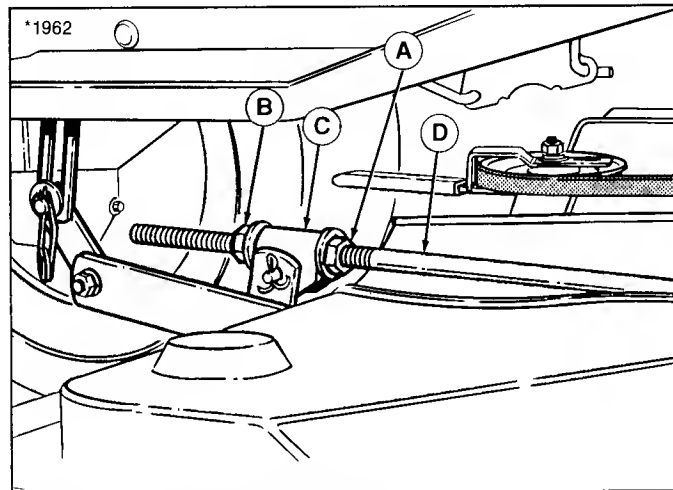


Figure 30. Front-To-Back Leveling

- A. Front Nut**
- B. Rear Nut**
- C. Mower Bracket**
- D. Adjustment Rod**

RETURN-TO-NEUTRAL ADJUSTMENT

Fully depressing the clutch/brake pedal should return the transmission control lever to the neutral position.

With engine off, PTO disengaged, and operator in seat, shift transmission lever into forward (drive) position. Fully depress the clutch/brake pedal and make sure lever returns to neutral gate. Turn key switch to ON position and check that neutral start light (green) is on. Repeat above check after shifting transmission lever into reverse position.

If adjustment is needed, follow these steps:

1. Shift transmission lever into forward (drive) position and fully depress clutch/brake pedal.
2. Loosen nut (A, figure 31) and push transmission lever firmly against stop in neutral gate.
3. Retighten nut.
4. Recheck clutch/brake pedal operation to make sure neutral light is activated.

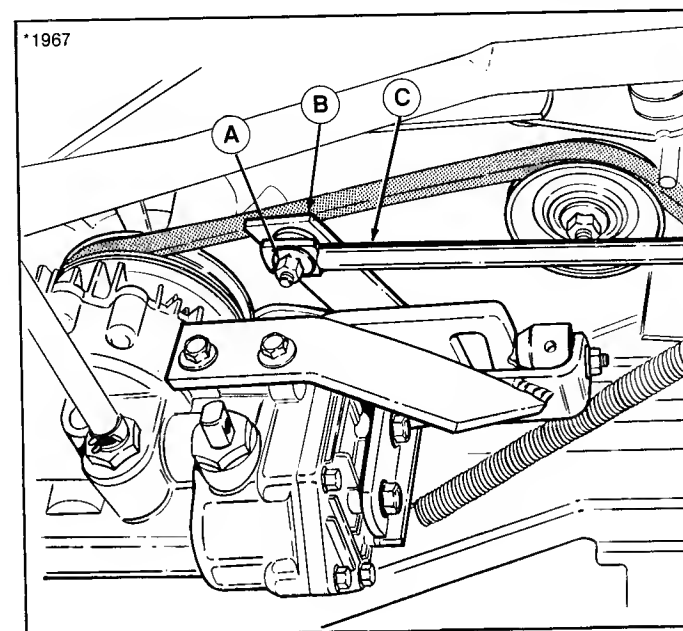


Figure 31.

A. Nut

B. Bracket

C. Transmission Control Rod

MOWER BLADE STOPPING CHECK

Mower blades and mower drive belt should come to a complete stop within five seconds after electric PTO switch is turned off.

With tractor in neutral, PTO switch disengaged, and operator in seat, start tractor engine. Look over left hand footrest at mower drive belt. Engage PTO switch and wait several seconds. Disengage PTO switch and check time until mower drive belt stops.

If mower drive belt does not stop within five seconds, perform PTO adjustment, page 43. Repeat above test and note belt stopping time. If belt still does not stop within five seconds, see your dealer to service electric clutch.

CLUTCH/BRAKE ADJUSTMENT

1. Engage parking brake.
2. Spring should be compressed to 2-1/8" long. Turn adjustment nut (A, figure 32) as necessary for correct spring length.

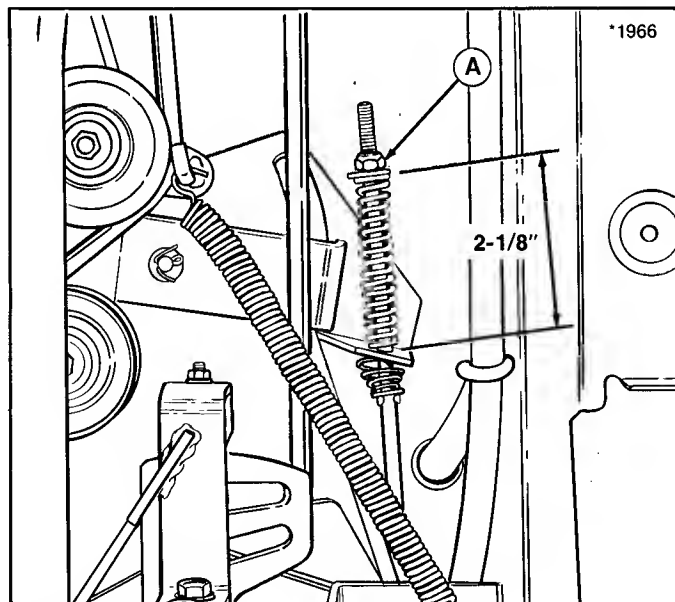


Figure 32.
A. Nut

STEERING GEAR ADJUSTMENT

If there is excessive slack in the steering system, the steering gear can be reindexed to the steering shaft gear. Refer to figure 33. Loosen two capscrews (A, figure 33) and push bracket so that gear teeth are closely meshed. Retighten nuts after adjustment.

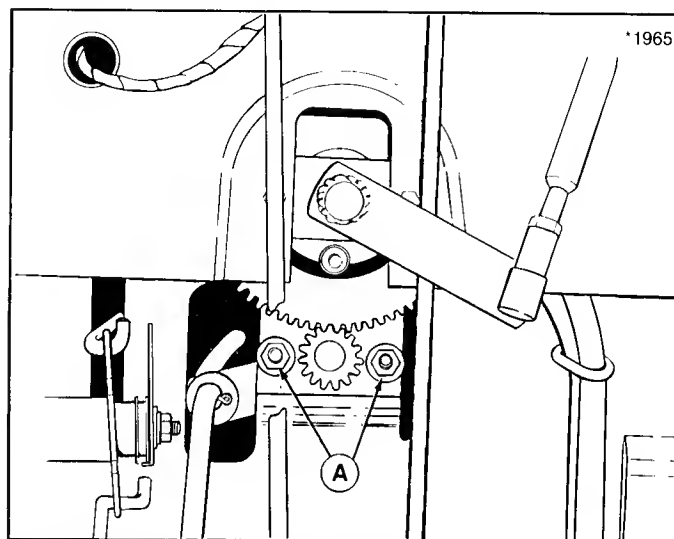


Figure 33. Steering Gear Adjustment
A. Capscrews

PTO CLUTCH ADJUSTMENT

1. Make sure engine is off and key removed.
2. Use a 0.010 to 0.012 feeler gauge to check the electric clutch at three places (A, figure 34). Insert the gauge. There should be a slight resistance as gauge is moved in and out of slot. If tight, or loose, go to step 3.
3. Loosen or tighten one of the nut (B) to adjust one of the three places. Loosen nut to increase gap; tighten to decrease gap.
4. After adjusting a nut, check the other two with feeler gauge. Adjustment at one location will change adjustment at other two locations. Make sure all three locations have proper adjustment.

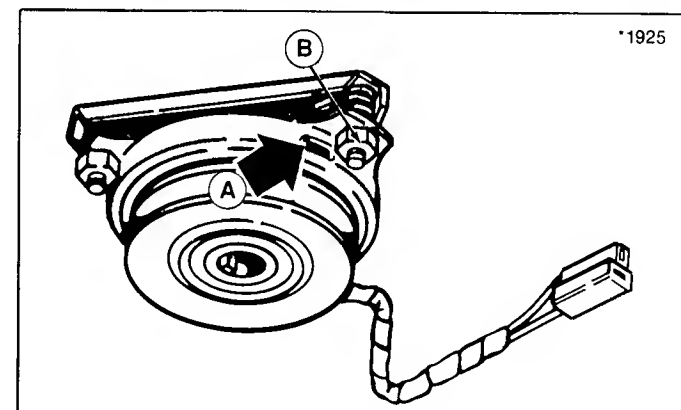


Figure 34. PTO Clutch Adjustment
A. Slot B. Adjustment Nut

International Symbols



Fast



Slow



**Operator Present
Switch (Seat)**



PTO Disengaged



PTO Engaged



Lights



Oil Pressure



Forward



Reverse



Parking Brake



Choke



Ignition On



Engine Running

Specifications

ENGINE:

12.5 & 16 HP (Twin Cylinders)

Make	Briggs & Stratton
Model	Vanguard™ V-Twin
Horsepower	12.5 & 16 HP @ 3600 rpm
Cylinders	2
Bore	2.68 In. (68 mm)
Stroke	2.60 In. (66 mm)
Displacement	29.3 Cu. In. (480 cc)
Construction	Overhead Valve, Cast Iron Sleeves, Aluminum Crankcase
Electrical System	12 Volt, 16 Amp Alternator Regulated Battery: 340 Cold Cranking Amps, 41 min. Reserve Capacity, Industrial Rated Starter Motor
Ignition	Magnetron Electronic Ignition
Air Cleaner	Ducted Paper Cartridge and Foam Precleaner large 325 sq. in. Air Filtering System
Lubrication	Full Pressure Lube w/ Oil Filter
Oil Capacity	3.5 Pints w/Filter (1.6 L)
Fuel Tank	Material: Non-Corrosive Polyethylene Fuel Tank Gauge Built Into Filler Cap Capacity: 4 Gallons (15.1 L)
Muffler	Quiet Compact, Low Back Pressure

12.5 HP (Single Cylinder)

Make	Briggs & Stratton
Model	Vanguard™
Horsepower	12.5 HP @ 3600 rpm (10.25 kw)
Cylinder	1
Bore	3.43 In. (87 mm)
Stroke	2.86 In. (73 mm)
Displacement	26.55 Cu. In. (435 cc)
Construction	Overhead Valve, Cast Iron Sleeves, Aluminum Crankcase
Electrical System	12 Volt, 9 Amp Alternator Regulated Battery: 340 Cold Cranking Amps, 41 min. Reserve Capacity
Ignition	Magnetron Electronic Ignition
Air Cleaner	Ducted Paper Cartridge and Foam Precleaner large 400 sq. in. Air Filtering System
Lubrication	Full Pressure Lube w/Oil Filter
Oil Capacity	4 Pints w/Filter (1.9 L)
Fuel Tank	Material: High Density, Non-Corrosive Polyethylene. Fuel Tank Gauge Built Into Filler Cap Capacity: 4 Gallons (15.1 L)
Muffler	Quiet Compact, Low Back Pressure

Specifications

TRANSMISSION:

Type	Hydrostatic
Pump	Variable Displacement Radial Ball Piston
Motor	Fixed Displacement Radial Ball Piston
Hydraulic Fluid	4.3 Pints (2.0 L)SAE 30 Premium Grade Engine Oil
Control	Single Lever w/Neutral Detent, Free-Wheeling Lever for Manual Tractor Movement, Continuously Variable, Forward & Reverse, without Braking or Gear Changing
Speeds @ 3400 RPM	w/20 x 8.00-10 Tires Forward: 0 - 5.3 MPH (0 - 8.5 km/h) Reverse: 0 - 1.7 MPH (0 - 2.7 km/h) w/18 x 8.50-8 Tires Forward: 0 - 4.9 MPH (0 - 7.9 km/h) Reverse: 0 - 1.6 MPH (0 - 2.6 km/h)
Differential	Hydraulic

CHASSIS:

Frame	Heavy Gauge Steel Channel. Power Take-Off Point: Front Engine Mounting: Above Front Axle Pivot Point Location: Front Axle
Rear Wheels	16 HP Tire Size: 20 x 8.00-10 Turf Type (Mfg. No. 1691796) 16 HP Tire Size: 18 x 8.50-8 Turf Type (Mfg. No. 1691807) 12.5 HP Tire Size: 18 x 8.50-8 Turf Type Pneumatic Inflation Pressure: 6-8 psi (41-55 kPa)
Axle	1-3/4" x 3" 12 Ga. Fabricated Tube
Front Wheels	Tire Size: 15 x 6.00-6 Pneumatic Inflation Pressure: 12-15 psi (82-103 kPa)

Accessibility Seat

Hood Tips Forward
Type: Bucket, High Back, Adjustable w/
Spring Suspension
Adjustable to Suit Different Size Operators
Inside Rear Tire: 16 In. (40.6 cm)

Turning Radius

CONTROLS:

Steering

Full Circle Steering Wheel
System: Gear and Sector
Location: Right Front
Combination Clutch/Brake/Parking Brake
Pedal Standard Equipment

Clutch/ Brake Pedal

Location

Mower Lift Lever: Right Side, Lower
Dash Tower
PTO Clutch: Electric, Dash Mounted
Shift Lever: Dash Mounted
Ignition Key Switch: on dash panel
Throttle Lever and Choke Lever: on dash panel
Light Switch: on dash panel
Separate Indicator Lights for Safety
Interlock Switch: Operator Present,
Transmission Neutral, PTO Disengaged,
Low Oil Pressure Warning Light

Specifications

DIMENSIONS:

16 HP

Overall Length	67 In. (170.2 cm)
Overall Width	35 In. (88.9 cm)
Height	To Top of Steering Wheel: 40 In. (101.6 cm) To Top of Engine Cover: 34 In. (86.7 cm)
Wheel Base	48 In. (121.9 cm)
Weight (approx.) without mower	Net: 455 lbs. (206 kg) Shipping: 575 lbs. (261 kg)

12.5 HP

Overall Length	67 In. (170.2 cm)
Overall Width	34.5 In. (87.6 cm)
Height	To Top of Steering Wheel: 39 In. (99 cm) To Top of Engine Cover: 33 In. (84 cm)
Wheel Base	48 In. (121.9 cm)
Weight (approx.) without mower	Net: 440 lbs. (200 kg) Shipping: 560 lbs. (254.5 kg)

MOWER:

44"

Effective Cutting Width	44" Mower - 44 In. (111.8 cm)
Overall Width with Deflector	44" Mower - 56 In. (142.2 cm)
Weight	44" Mower - 115 lbs. (52 kg)
Variable Cutting Ht.	1 - 3.6 In. (2.5 to 9.1 cm)
Blade Arrangement	Three Staggered Blades
Mower Drive	V-Belt From Tractor PTO Pulley
Spindle Bearings	Lubricated and Sealed Ball Bearings

38"

Effective Cutting Width	38" Mower - 38 In. (96.5 cm)
Overall Width with Deflector	38" Mower - 49.5 In. (125.7 cm)
Weight	38" Mower - 100 lbs. (45 kg)
Variable Cutting Ht.	1.0 - 3.6 In. (2.5 to 9.1 cm)
Blade Arrangement	Two Blades
Mower Drive	V-Belt From Tractor PTO Pulley
Spindle Bearings	Lubricated and Sealed Ball Bearings

Common Replacement Parts

Listed below are part numbers for the more common replacement parts. Only genuine Deutz-Allis replacement parts will assure optimum performance and safety. Do not attempt repairs or maintenance unless proper procedures and safety precautions are followed. For assistance in any area, see your dealer.

REPLACEMENT PARTS

QTY.
PER
UNIT

DESCRIPTION

PART
NUMBER

	Mower Blades	
1	R.H., 38" Deck	1704101
1	L.H., 38" Deck	1704856 1704400
3	44" Deck	1704856 1704400

Mower Belts

1	38" Mower Drive	1666698
1	44" Mower Drive	1601672
1	44" Deck Drive	1607813
1	Tractor Drive Belt	1607813
1	Safety Clip - Mower Lift	176012 72087544
1	Key	1704348
2	Interlock Switch, Neutral	1701521
1	Interlock Switch, Seat	1704379
1	Battery	1685215 72087848
1	Solenoid	1685290
1	Switch, Electric Clutch	1703798
1	Switch, Oil Pressure (On Engine)	1703956
1	Headlamp Bulb	1677371

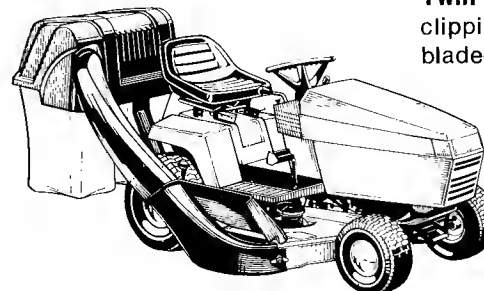
*Put in
Sump for #
Next phone
To
Green Book
on tractor
etc.*

*Can - for D A books, do you want
① these #'s converted back to SMI #'s
② add "green paint" and oil specs
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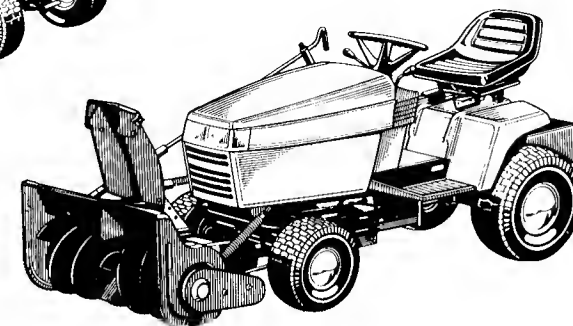
Optional Attachments and Accessories

See your dealer to purchase these items.

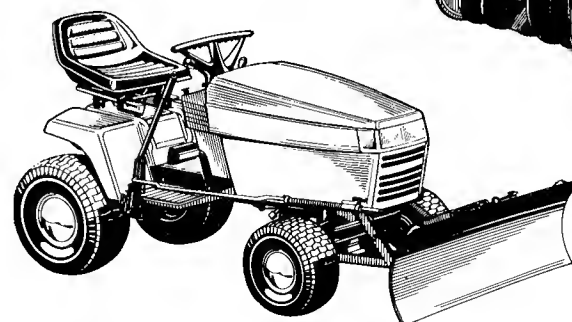
Deck-Vac Twin Bag Collector
Twin Bag Catcher
Deck-Vac Quad Bagger™
Thatcher
Dump Cart
36" & 42" Snowthrower
42" Dozer Blade
Snow Cab
Front Counterweights
Rear Wheel Weights
Weight/Tote Box
Hubcaps
Tire Chains



Twin Bag Collector - Collect grass clippings, thatch, and leaves with our blade-driven vacuum collector.

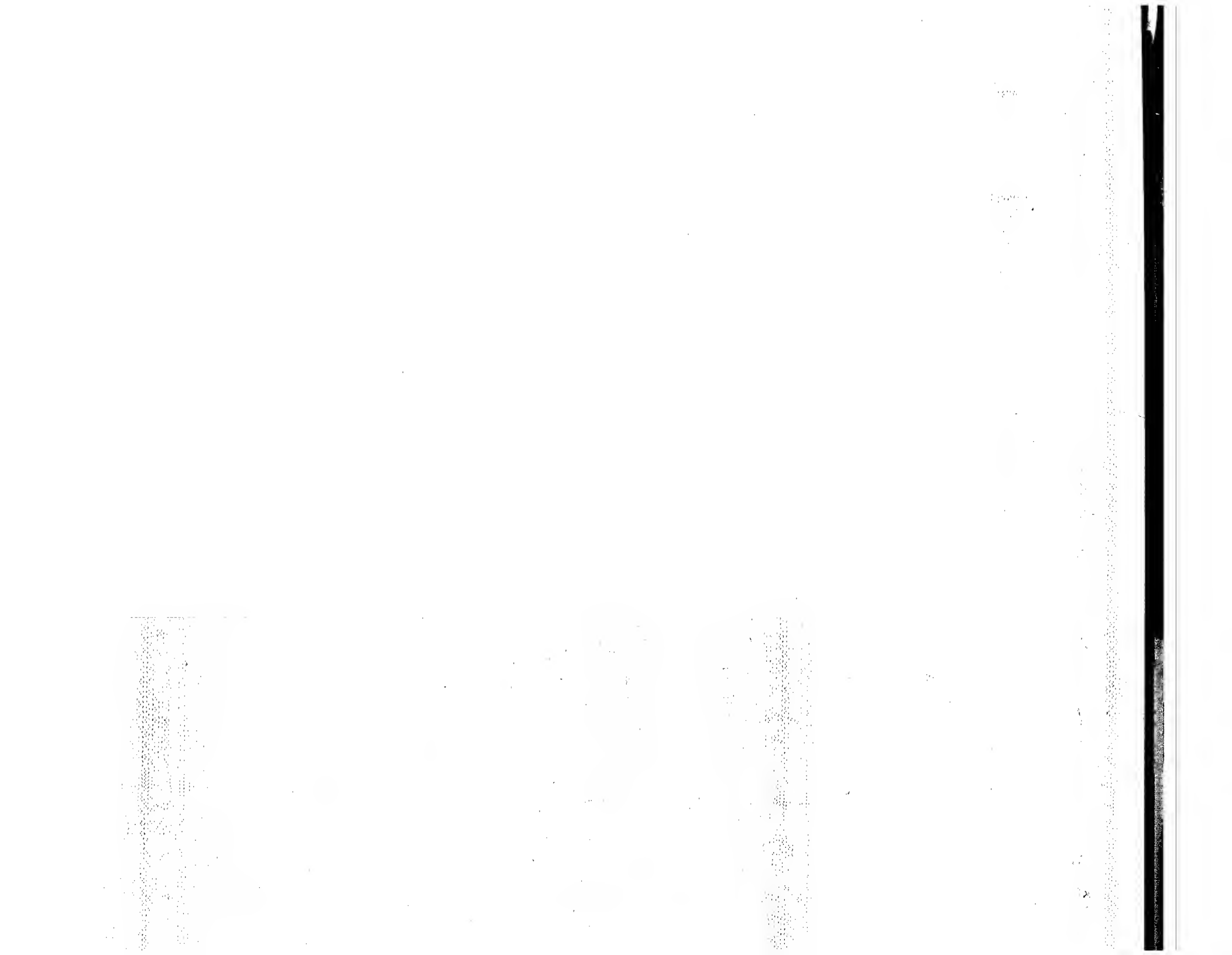


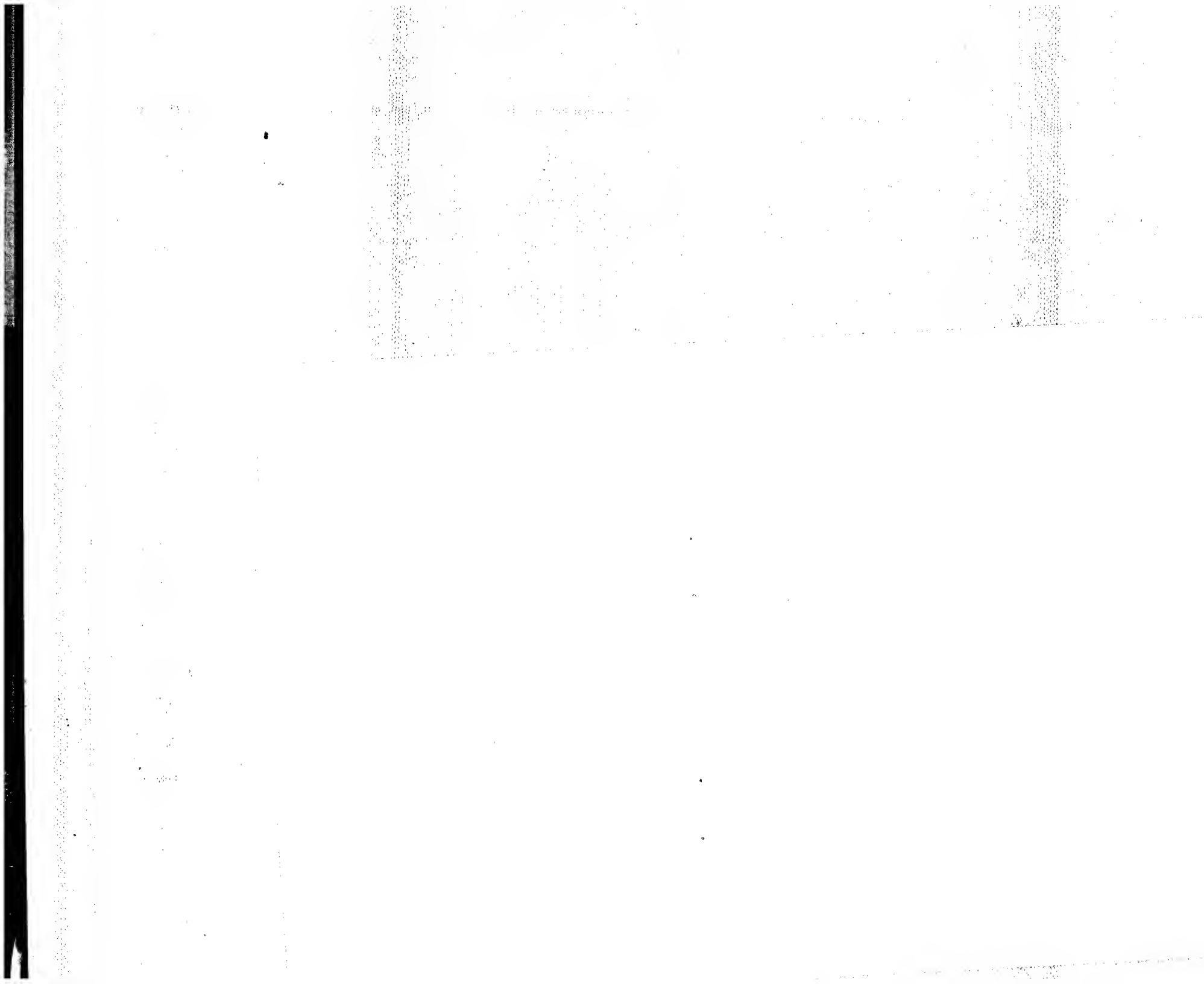
36" & 42" Snowthrower - Efficient single stage operation to handle the heaviest of snows.



42" Snow Plow/Dozer Blade - For snow removal and light dozing of dirt, gravel, etc.







DEUTZ-ALLIS Corporation
5295 Triangle Parkway
Norcross, GA 30092

